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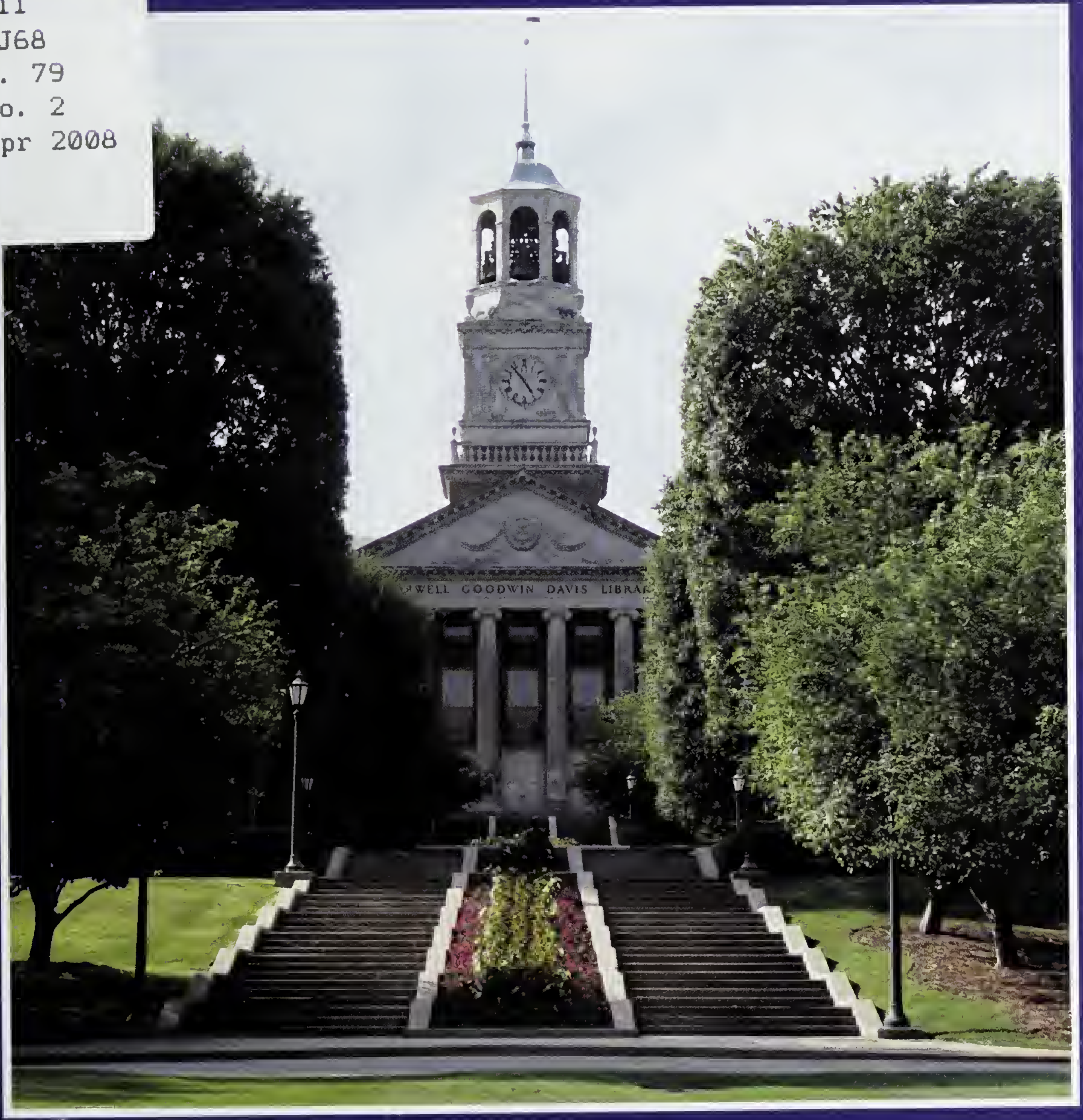

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Editorial Comment:

This issue of the Journal is dedicated to the memory of Dr. Ronald Lee Jenkins, professor of Biology at Samford University, who passed away on April 27, 2007 at the age of 54. He was a wonderful friend and mentor for many students and colleagues. Ron was very active in the Academy, which he served as President from 2004-2005. Dr. Jenkins is survived by his wife, Kelly Noordermeer Jenkins and two children, Ben and Anna-Lea; his mother, Helen Jenkins of Atlanta, and sister, Barbara Jenkins Riddle of Nashville. Ron's dedication to teaching and science will always be remembered through his publications, and through the achievements of his students.

Safaa Al-Hamdani
Editor: Alabama Academy of Science Journal

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ABSTRACTS
The 85th Annual Academy of Science Meeting
Samford University
Birmingham, AL
March 19-22, 2008

Anthropology Paper Abstracts

19TH CENTURY LAND SURVEYS IN THE TALLAPOOSA RIVER VALLEY, AN EXAMINATION. *Christina Breeden* and John Cottier, Dept. of Sociology, Auburn University, Auburn, AL 36830.

In 1832, the Creeks signed the Treaty of Cusseta with the U.S. government, ceding lands in Alabama. Surveys that carried out after the treaty now reside with the Alabama Secretary of State. By accessing these surveys in PDF format through the Secretary of State's website, I have mapped the surveyors' floral and cultural findings from an area of Tallapoosa County. The purpose of this is to provide other researchers with an opportunity to better understand historical floral populations, as well as potential areas of cultural interest (i.e., possible future archaeological sites). The floral environment is well documented; unfortunately, this area had few cultural areas marked by the surveyors. Despite the negative results, this research nonetheless allows others a better understanding of survey processes and findings.

A CERAMIC ANALYSIS OF TWO PROTOHISTORIC DOMESTIC STRUCTURES AT HICKORY GROUND, 1EE89. Cameron W Gill and *Sean M Blough*, Auburn University 7030 Haley Center, Auburn University, Auburn, AL 36849.

Excavations conducted on behalf of the Poarch Creek Indians at the Historic Creek town of Hickory Ground (1Ee89) have recovered evidence of an extensive proto-historic occupation. Material culture from this occupation is largely associated with the domestic structures, and includes extensive ceramic and lithic artifacts. Analysis conducted of two separate domestic structures; Feature 500, which contains a flat hearth and Feature 509, which contains a rimmed hearth, demonstrate similar ceramic assemblages. Ceramic types from each domestic structure are compared to determine variance in types and distributions between the two structures.

BRITISH PIPE TOMAHAWKS IN ALABAMA ARCHAEOLOGY. *Dr. John W. Cottier*, Auburn University 7030 Haley Center, Auburn University, Auburn, AL 36849.

Throughout the majority of the 18th century British interactions with the southeastern Native Americans revolved around a combination of political and economic factors. The utilization of "trade goods" was often accomplished to solidify relationships and to establish patterns of economic dominance. The material evidence of these interactions are often identifiable in archaeological context. Any analysis of these remains clearly demonstrates the presence of numerous metal items that were common in everyday life throughout England during the 18th century. Thimbles, belt loops, buckles, bells, and similar objects were elements of everyday usage in many locations throughout England, and were consistently utilized for trade in the Americas. Another level of trade material represented objects that were directly manufactured for use in trade situations. One such artifact was the pipe tomahawk. One of the most common was a brass body with an iron bit, and at least three examples have been identified from archaeological context in Alabama.

INSHORE FISHING IN LAU, AN INDEPENDENT ETHNOGRAPHIC DOCUMENTARY FILM. *Joseph Ortega* and Sharyn Jones, Dept. of Anthropology, University of Alabama at Birmingham, Birmingham, AL 35294.

This documentary film is focused on a traditional Fijian fishing method called "vono". In modern Fiji, this method is only practiced in the Lau Group on the island of Lakeba. Like all inshore fishing traditionally done in Fiji, this complex net fishing method is organized and run entirely by women. This film follows an elder fisher woman and her successors during a rare cultural event that has changed little since it originated. The research documented in this film was supported by a grant from the National Geographic Society.

PREDICTIVE MODEL OF RINGFORT LOCATIONS IN VANUA LEVU, FIJI USING REMOTELY SENSED DATA. *Kelly French*. University of Alabama at Birmingham, Birmingham, AL 35294.

Assessing known ring fort locations within Fiji can reveal patterns of fort locations within this diverse landscape. The primary objective of this study is to examine landscape patterns in relation to ring fort locations on the island of Vanua Levu, Fiji with analysis of Landsat ETM+ and SRTM imagery in order to create a predictive model of site locations. Examining various electromagnetic band combinations with Landsat data allows close analysis of the Fijian landscape. The Normalized Difference Vegetation Index (NDVI) distinguishes vegetation density and health by examining the photosynthetic efficiency of plants. Applying the NDVI ratio to the Landsat imagery illustrates vegetation density surrounding sites providing information on vegetation that is necessary in creating the predictive model. Separating distinguishing land features at known sites using classification is also applied in order to relate site locations with specific geographic features. Digital Elevation Models (DEM), created from SRTM data, provide information on the elevation of the landscape, and by examining the elevation of sites height data can be applied to the model. The DEM along with the Landsat analysis provides preliminary evidence of probable site locations. Initial results suggest an increase in fort building around 1300 AD, a pattern that may be associated with climate change that forced inhabitants inland near fresh water sources and rich defensible land.

PRELIMINARY ARCHAEOLOGICAL INVESTIGATIONS OF THREE STONE STRUCTURE SITES ALONG CHOCCOLOCCO MOUNTAIN, CALHOUN COUNTY, ALABAMA. *Harry O. Holstein*, Dept. of Anthropology, Jacksonville State University Jacksonville, AL 36265.

Beginning in 2005, the Jacksonville State University Archaeological Resource Laboratory conducted preliminary archaeological investigations upon three stone structure sites located along Choccolocco Mountain in Calhoun County, Alabama. The Shelton Mound Complex, 1Ca637 and the Snake Effigy site, 1Ca157 were both mapped,and photographed. From initial observations made during investigations and information obtained from ethnographic and archaeological data concerning similar stone structures in the Eastern United States, several possible explanations for their origin and function are discussed in this paper. The Morton Hill Stone Wall Complex, 1Ca671 has been repeatedly visited over the last year, initial photographs and observations will also be discussed in this paper. All three mound site are believed to have been constructed by prehistoric populations during the Woodland and early Mississippian time periods.

SOCIAL CONTEXTS OF THE HEMPHILL STYLE AT MOUNDVILLE. *Erin Phillips*, Department of Anthropology, University of Alabama, Tuscaloosa, AL 35487-0210.

The Hemphill style is a representational art style local to Moundville, found in four genres: paint palettes, stone pendants, copper gorgets, and pottery. While all four genres will be discussed, the focus will be on the Hemphill-style pottery and its contexts of use. Mortuary analysis has suggested that several social identities are marked by these artifacts. Other studies focusing on the iconography provide additional information about social contexts of use. Further information can be gleaned by examining the distribution of the pottery at Moundville, use-wear, the groupings of images, the placement of the designs on the vessels, and image size.

THE ETHNOARCHAEOLOGY OF FISHING IN FIJI'S LAU GROUP. Sharyn Jones, Dept. of Anthropology, University of Alabama at Birmingham, Birmingham, AL 35294.

Drawing from my research and ethnoarchaeological work in the Lau Island Goup of Fiji, I discuss how modern studies of human-animal relations may contribute to archaeological questions. I begin by providing background on my research and then explore different definitions of "ethnoarchaeology" and their theoretical and methodological implications. Archaeological studies of prehistoric subsistence frequently apply optimal foraging (OF) models to explain human behavior and to account for the zooarchaeological record. My data on subsistence and foodways collected in the Lau Islands is used to explore the usefulness of OF models for understanding human behavior in both the past and the present. The underlying assumption of OF is that individuals relate to their environment in ways that maximize their reproductive success. Many common Lauan resource collection and production practices appear to be non-optimal. That is, the behavior goes against predictable foraging strategies with the best return for a given amount of effort. I argue that these behaviors are better understood in the context of local Lauan definitions of success and value.

THE ETHNOARCHAEOLOGY OF FISHING IN FIJI'S LAU GROUP. *Sharyn Jones*, Department of Anthropology, University of Alabama at Birmingham, Birmingham, AL 35294.

Drawing from my research and ethnoarchaeological work in the Lau Island Group of Fiji, I discuss how modern studies of human-animal relations may contribute to archaeological questions. I begin by providing background on my research and then explore different definitions of "ethnoarchaeology" and their theoretical and methodological implications. Archaeological studies of prehistoric subsistence frequently apply optimal foraging (OF) models to explain human behavior and to account for the zooarchaeological record. My data on subsistence and foodways collected in the Lau Islands is used to explore the usefulness of OF models for understanding human behavior in both the past and the present. The underlying assumption of OF is that individuals relate to their environment in ways that maximize their reproductive success. Many common Lauan resource collection and production practices appear to be non-optimal. That is, the behavior goes against predictable foraging strategies with the best return for a given amount of effort. I argue that these behaviors are better understood in the context of local Lauan definitions of success and value.

Behavioral and Social Sciences Paper Abstract

HOLY OR HOLIER THAN THOU: EFFECTS OF PRAYER ON MMPI-2 SCALES.

***Daphne O. Garner*, Brianna Morton and Larry W. Bates. Dept. of Psychology, University of North Alabama, Florence, AL 35632.**

Prayer is one of the most common behaviors within most religious systems, yet data concerning this simplest of religious acts is sparse. The primary purpose of this research was to investigate whether the act of praying would differentially affect the validity scales of the MMPI-2. Other religious measures, the Structured Prayer Scale and Intrinsic-Extrinsic-Revised Scale, were acquired for correlational analyses. There were 59 university students who were randomly assigned to one of two groups according to order of prayer and assessment: prayer-questionnaires (PQ) and questionnaire-prayer (QP). Prayers were recorded on cassette tapes and transcribed for future analysis. This preliminary report examines the questionnaire data and primary experimental intervention. Results for the order effect indicated that the PQ group generally had more honest responding according to validity scales, but several non-K-corrected clinical scales were elevated in this group. Correlational data concerning religious and personality variables are also provided.

MEASURING COMPUTER-RELATED STRESS: CURRENT STATUS.

***Richard A. Hudiburg*, Department of Psychology, University of North Alabama, Florence, AL 35632.**

This paper explores the current status of the construct of computer-related stress. By contrast, this construct is in less uses in empirical research as compared to the construct of computer anxiety. To encourage more research using the construct of computer-related stress, Hudiburg (2005) reported an initial effort to revise the 37-item Computer Hassles Scale. This updated scale contained 34 new items in order to more reflect computer use in the 21st Century, especially the Internet use. A reanalysis of the data used by Hudiburg (2005) was performed using three samples (Ns=200, 330, & 242) and a merged sample. Factor analyses with rotations were performed on each sample separately and on the merged sample. These factor analyses yielded interpretable three factor solutions. An examination of the factor loadings across samples and in the merged sample resulted in the elimination of five items. This process resulted in a revised scale of 66 items with three subscales. Internal consistency reliability analysis was performed on each factor using only the salient factor loadings (≥.40). The reliability analysis yielded high internal consistency alphas ([illegible] = .9536 (F1); [illegible] =.9410 (F2); [illegible] = .9134 (F3)). The revised 66-item scale was correlated significantly with both a measure of somatic complaints (r = .326; p = .000) and a measure of global stress (r = .185; p = .000). This 66-item Computer Hassles Scale – Revised has evidence of reliability and convergence validity and should encourage new research about computer-related stress.

PROGRAMMED INSTRUCTION AS AN APPROACH TO TEACHING. ***Saramma T. Mathew*****, Dept. of Psychology, Counseling and Foundations of Education, Troy University, Troy, AL 36082.**

Programmed instruction is a teaching method in which information is presented in sequence of distinct units and the correct response to each unit is necessary before the learner may move to the next unit. It is only indirectly concerned with what learners do, but mainly concerned with what program developers do. So programmed instruction represents the teaching side of the teaching/learning process. The paper deals with a brief history of origin, background, and development of programmed instruction, followed by its characteristics, advantages and limitations. The paper will also include the steps in developing a programmed instruction such as training needs assessment(pretest), task analysis(for mastery specification), target audience analysis, instructional design (flow chart, role of instructor), instruction (developing draft of frames and editing), developmental tryouts to debug the programmed instruction and finally assessing the end of program objectives through criterion post tests. The characteristics of programmed instruction changed over time, but it gave birth to Computer Assisted Instruction and it is very much alive today connecting the past and the present.

Behavioral and Social Sciences Posters Abstract

Analysis of Factors Associated with the Municipal Bankruptcy of Pritchard, Alabama. ***Christopher Robin Kelley*****, Auburn University, Auburn, AL 36849.**

Prichard, Alabama presents a textbook analysis of how financial distress factors can lead to municipal bankruptcy. In the case of Prichard, these financial distress factors were left unaddressed and eventually led the financial collapse of the municipality. One factor that impacted Prichard was a declining population which was marked by a loss nearly half of its population since the 1960's. A multitude of problems arose from the loss of population including a general loss of those citizens best positioned to fund the necessary services to support and maintain the city. As the population shifted, so did the overall economic base of the community shift from Prichard to the outlying suburbs of the Mobile region. Therefore, the municipality not only lost population but it also realized the decimation of both its commercial and industrial base. Prichard was also faced with significant issues involving the citizen's lack of faith in the government. This level of distrust in the government severely limited the ability of civic leaders to affect change in the face of adverse conditions. Finally, there was a substantial issue with financial mismanagement in the municipality, leading to the utilization of budgetary processes which did not adequately account for the need and abilities of the city during the time. Ultimately, the municipality faced ever decreasing revenue streams which were coupled with an increasing debt load. This led the City of Prichard, Alabama to file for Chapter 9 Bankruptcy in 1999. At that time, the municipality was over $3.9million in debt which it could not service.

Neighborhood Revitalization through Infill Housing Development. ***Nikita D. Moye*, Dept. of Community Planning and Urban Studies. Alabama A&M University, Normal, AL, 35762.**

Development of infill sites in established city neighborhoods can provide countless public benefits. It can furnish needed housing, expand opportunities for homeownership, and help retain and attract economic development opportunities. (Suchman and Sowell, 1997) Infill housing also offers development opportunities that maximize the use of existing infrastructure, and public facilities within a municipality. The use of existing infrastructure does not require substantial amounts of public expenditure, and can help spread among more tax payers the fixed costs of operating and maintaining the existing infrastructure. (Suchman and Sowell, 1997) The principle goal of the research is to illustrate the role housing plays in the revitalization and stabilization of urban communities. To accomplish this goal, the researcher chose to conduct an Action Research project that chronicles the design, implementation and completion of the Windsor Manor infill housing development project located in Huntsville, AL. The Alabama A&M University Community Development Corporation (AAMU CDC) in partnership with Hines Homes, the Federal Home Loan Bank and First American Bank will design, build, and assist prospective homeowners in securing mortgages for 16 new affordable housing units on 16 currently vacant lots scattered within the subdivision. The project was implemented in March 2007 and is scheduled to be completed by February 2009.

STROKE INDUCED VENTRICLE EXPANSION AND ITS EFFECT ON MOTOR ABILITY AND MOTOR RECOVERY AFTER CI THERAPY. ***Adrianne McCullars*, Christi Perkins, Lynne Gauthier, Victor Mark, Edward Taub, and Gitendra Uswatte. University of Alabama at Birmingham, Birmingham, AL 35294.**

The amount of lateral ventricle asymmetry was measured from MRI scans and compared to motor deficit due to stroke and motor recovery due to Constraint-Induced Movement therapy (CI therapy). We included chronic stroke patients ($n = 47$) along with control patients obtained from Open Access Series of Imaging Studies (OASIS). Ventricle asymmetry was calculated for each CI therapy patient and OASIS control. Ventricle asymmetry was correlated with lesion volume ($r = 0.318$), and chronicity ($r = 0.456$) in the stroke group. It was not correlated with the pre- or post- treatment outcome scores. When comparing the patient ventricle asymmetry to the OASIS ventricle asymmetry, we found a significant difference between the two ($t = 4.256$). We also found a correlation between ventricular and peduncular asymmetry ($r = -.525$). The correlation between lesion volume and ventricular asymmetry indicates that larger infarcts might induce more ventricular expansion. The relationship between ventricular expansion and chronicity indicated that ventricles might continue expanding over time. The stroke patients had more ventricular asymmetry than the OASIS control patients. While we can not prove its causality, the relationship between ventricular and peduncular expansion indicates that ventricular expansion coincides with the size of the corticospinal tract in the midbrain. The comparison of ventricular expansion and motor ability suggest that ventricular asymmetry due to stroke has no effect on motor deficit or motor recovery. Supported by NIH Grant 5RO1HD03427.

THE EFFECT OF CI THERAPY ON THE WHITE MATTER PORTIONS OF THE BRAIN: A DTI STUDY. ***Christi Perkins*****, Lynne V. Gauthier, Victor W. Mark, Edward Taub, Gitendra Uswatte, Department of Psychology, University of Alabama at Birmingham, Birmingham, AL 35294.**

CI therapy, an efficacious neurorehabilitation treatment, produces a plastic structural change involving an increase in gray matter in chronic stroke patients. The purpose of this study was to determine if the same plasticity is found in white matter using Diffusion Tensor Imaging (DTI). There were fifteen patients included in this preliminary study: four patients received CI therapy, eleven patients received a comparison therapy. We measured the integrity of white matter fibers using DTI, which is a structural imaging technique that is based on calculating the magnitude and direction of water flow in the brain yielding a value for fractional anisotrophy (FA). A high FA indicates highly directional water flow, which indicates a more cohesive bundle of axons. FA scores were calculated before and after therapy and histograms were created to represent the distribution of FA values over the entire brain. The patients that received CI therapy showed a rightward shift in the FA histogram curve towards higher FA values while the patients that received the comparison therapy showed no shift. The change in FA from pre- to post-therapy was significant in the CI therapy patients ($p < 0.001$). While this is a preliminary study with a small number of participants, the findings point to significant changes in the integrity of white matter fibers due to an efficacious motor therapy.

Bioethics, History, and Philosophy of Science Paper Abstracts

BIOTECHNOLOGY AND ETHICS IN TECHNICAL COMMUNICATIONS COURSES. ***Michelle Sidler*****, Department. of English, Auburn University, Auburn, AL 36849.**

Teaching biotechnology within the humanities as well as the sciences is vital because of its immediate ethical, legal, and social implications. Upon first learning the basics of biotechnology, many students readily make connections between biomedical practices and their bodies, their families, and their politics. Writing courses offer an opportunity to reflectively critique biotechnology within cultural and familial contexts while using writing as a medium to both understand the science and reflect on ways to enact change. My presentation reports on just such a course, a biotechnology-themed "special topics" course taught to upper-level undergraduate and graduate students in technical communication. I argue that the study of biotechnology impacted students' lives in ways that brought together their skills in technical communication with their personal, social, and political relationships, fostering an ethic of care in their professional discourse. By teaching biotechnology in writing courses, non-science majors begin to understand that C.P. Snow's division between the culture of humanities and the culture of science is increasingly a false binary because advances like biotechnology directly impact not only scientific research but also our human selves.

ETHICAL ISSUES IN GENETIC TESTING: THINK BEFORE YOU TEST ***R. Lynn Holt*** **School of Health Professions, University of Alabama at Birmingham, Birmingham, AL 35294.**

Genetic testing has been available for the diagnosis of single gene disorders and chromosome conditions for over 30 years. This testing has only been applicable to a small portion of the general population. With the mapping of the human genome and the identification of genes involved in more common conditions such as cancer, heart disease and diabetes, genetic testing is becoming an integral part of routine medical care. Along with these advances come ethical concerns related to individual privacy and confidentiality, autonomy, and genetic discrimination. It is essential for individuals and health professionals to consider these and other related issues as the role of genetic testing in medicine expands.

GENE MATTERS IN CANCER RESEARCH. *Isaac M.T. Mwase*, **National Center for Bioethics in Research and Health Care, Tuskegee University, Tuskegee, AL 36088.**

Bioethics and other fields have increasingly focused attention on inequities in health and health care. Effort has been directed toward the elimination of disparities in health and health care. While biomedical research undertaken to achieve this goal assumes correctly that addressing the social determinants of health is paramount, there is a growing acknowledgment that genetic research should be pursued with vigor at the risk of overstating the significance of genetics in the complex array of factors that contribute to unequal health. In cancer research, there is a growing recognition that certain populations experience disproportionate burdens of various cancer morbidity and mortality. The pursuit of cancer genes through admixture research should be encouraged, while resisting the stigmatization and other negative consequences that accompany the association of particular cancer genes with particular racial and ethnic minorities. Gene matters in cancer research have to be explored against the backdrop of a clear-headed understanding of race matters in biomedical research.

PHILOSOPHERS AND PRIMATES. ***Gerard Elfstrom*****, Department of Philosophy, 6080 Haley Center, Auburn University, Auburn, AL 36849-5210.**

Frans de Waal has demonstrated that primates assist one another, cooperate, and may have a sense of fairness. These abilities clearly reveal something important about primates, but de Waal believes they also reveal important things about humans. He is convinced these findings show that human individuals are not self-centered, amoral beings whose impulses are held in check by a thin 'veneer' of moral constraint. He cites Thomas Huxley, Darwin's Bulldog, as an example of one who espouses a veneer theory, and castigates him for straying from his Darwinian roots. However, a look at Huxley's work reveals a view at odds with veneer theory and eerily close to de Waal's own position. In addition, Huxley addresses several troublesome matters that latter day theorists, de Waal included, have overlooked. Where de Waal emphasizes the altruistic facets of human behavior, Huxley believes the selfish and altruistic must remain in conflict. Huxley also unearths a third driver of behavior, reproduction. De Waal believes that the level of resources available and hierarchy modulate the forces of selfishness and altruism, but Huxley emphasizes the role of social development. The paper will show how these forces interact with one another and suggest directions for future research.

SCIENCE: MYTHOLOGY FOR THE 21ST CENTURY? ***James T. Bradley*****, Department of Biological Sciences, Auburn University, and Clark E. Lundell, Department of Industrial Design, Auburn University, Auburn, AL 33849.**

Cosmogonic myths form the core of virtually all religions. Scientist/philosopher Ursula Goodenough writes that myth addresses two fundamental human concerns: 'How things Are' (origins) and 'Which Things Matter' (morality) (The Sacred Depths of Nature, 1998). Her view that myth as both explanatory and prescriptive is consistent with definitions of myth suggested by mythologists including Henri Fanfort (The Intellectual Adventure of Ancient Man, 1946) abd Fritz Graf (Greek Mythology, 1993). Modern science too is 'a way of knowing' with explanatory and prescriptive components. Science addresses origins of the universe and humankind. Less appreciated is the moral dimension of science. In Science & Human Values (1965), Jacob Bronowski identifies moral values necessary for the practice of science (honesty, trust, cooperation, egalitarianism), and E.O. Wilson (Consilience, 1998), Jonathan Haidt (In The Innate Mind, In Press) and others explore the biological basis of morality. In fact, Haidt has identified five innate moral intuitions, all presumably products of natural selection: caring, fairness, loyalty, respect and purity. Some claim that the supposed dogmatic nature of myth distinguishes it from science, but even science has its doctrines, e.g. that the universe is understandable, and paradigms within which normal science must be practiced. We conclude that science can credibly be called a mythology for the 21st century.

Biological Sciences Paper Abstracts

"DETECTION OF TOTAL AND PATHOGENIC SALMONELLA IN OYSTER USING REAL-TIME PCR" ***Maulshree Gangwar*****, Department of Biology, University of Alabama at Birmingham Dr.Asim K.Bej, Department of Biology, University of Alabama at Birmingham. Birmingham, AL 35294.**

Salmonella is a causative agent for food and water borne gastroenteritis in humans. A multiplex PCR-based detection revealing total and potentially virulent strains of Salmonellae was developed using oligonucleotide primers. These primers targeted chromosomally located invA gene generating a 0.274 kbp and Salmonella virulence plasmid-borne spvB gene generating 0.561 kbp amplified DNA fragments. The invA gene product brings about the invasion of the cells on the intestinal epithelium and is used as the marker for total *Salmonella* detection. The occurrence and distribution of these genes in 90 strains exhibited 100% amplification of invA gene whereas only 22% of spvB gene implying their virulent nature. Real-Time PCR platforms, in contrast to conventional PCR, are rapid and obviate the need for further confirmation steps such as gel electropho-resis. The objective of the present study was to establish simple and specific methods to detect invA and spvB gene coding using SYBR-green Real-Time PCR. In each reaction, 16S rRNA gene was targeted as a competitive Internal Amplification Control (IAC) and used to identify detection of any false positives. The sensitivity of the reaction at all 3 targeted gene loci was found to be 1 pg. The analysis showed specific PCR products identified by melting curve analysis, and a reproducible melt temperature in the range of 88.0 to 89.53°C (spvB), 83.06 to 85.48°C (invA) and 86.32 to 87.99°C (16S rRNA) was observed for all Salmonella strain. Negative controls and non-*Salmonella* strains showed an IAC-specific melt peak at 77.0±2.0 °C, giving evidence of the specificity of the method. The sensitivity of Real-Time PCR was found to be 1 ng that is comparable to approximately 104 cfu *Salmonella* enterica. The sensitivity was confirmed in pure cul-tures as well as in oyster tissue homogenate enriched with Salmonella.

AMYLOID β 42-BINDING D-AMINO ACID PEPTIDE TREATMENTS AFFECT AMYLOID DEPOSITION AND REDUCE INFLAMMATION IN APP/PS1 MUTANT MICE ***Amy Nelson*****, Inga Kadisha and Thomas van Groen, University of Alabama at Birmingham, Birmingham, AL, 35294. Dieter Willbold, Forschungscentrum Juhlich, Juhlich, Germany.**

Alzheimer's disease (AD) is an irreversible disorder of the brain causing loss of mental and physical function eventually leading to death. This disease is becoming more prevalent with an estimated thirteen million individuals predicted to be diagnosed by the year 2050. We are attempting to develop a better treatment modality for AD that improves cognitive function. To do so, we are using transgenic mice which express two AD mutations, PS1 ΔE9 and APPswe. These mice develop three types of deposits: plaques, diffuse deposits, and cerebral amyloid angiopathy. These different amyloid deposits display distinct inflammatory characteristics. We hypothesized that long-term treatments that interact with Aβ42 would result in changes in amyloid deposition and, likely, in the inflammatory reaction. Thus, we investigated the effects of small, Aβ42-binding peptides that consist of D-amino acids on amyloid deposition. After two month treatment with amyloidβ42-binding peptide D3 there is a slight improvement in cognitive function, and a significant reduction in deposition of amyloidβ. A β-load was significantly reduced in the cerebral cortex and hippocampus, and inflammation was significantly decreased around the amyloid deposits in the D3-treated mice compared to the control. Together these suggest that the amyloid-binding peptide influences the aggregation characteristics of amyloidβ and the inflammatory characteristics of the amyloid fibrils. Thanks to Drs. van Groen, Kadisha, Wyss and Watts for support and encouragement.

ANALYSIS OF SOUTHEASTERN HERPETOLOGICAL COMMUNITIES: SALAMANDERS. *Brett Macek*, George Cline, and Robert Carter. Biology Department, Jacksonville State University, Jacksonville, AL 36265-1602.

In this study, we examine the salamander communities of 26 sites in the southeastern United States. All species lists were taken from published manuscripts, or from unpublished projects with the approval of the researchers. Taxonomic changes that have been made since these papers were published have been corrected here when possible. Fifty-four species were recorded from these sites. Species richness ranged from 1-31 species present. Three sites (11.5%) had very high species richness (17 and 31 species). Ten sites had high species richness (8-13 species), but half of the sites had low species richness (1-6 species). Most of the species had very narrow distributions; 26 species were only found at one of the sites and 47 species were found a 8 or fewer of the sites. Only 7 species were found at more than 8 sites (9-16 sites). This is similar to patterns seen in southeastern frogs, but salamanders appear to be more restricted to specific sits/habitats than frogs. Distribution patterns were analyzed using cluster analysis and principle components analysis correspondence analysis.

CAFFEINE AFFECTS EMBRYOLOGICAL DEVELOPMENT OF THE SEA URCHIN, LYTECHINUS VARIEGATUS. *Alicia L. Kindred*, Anita Patel, Victoria K.Gibbs, Addison L. Lawrence and Stephen A. Watts, Department of Biology, University of Alabama at Birmingham. Birmingham, AL 35294.

After the decoding of the S. purpuratus genome, sea urchins have become an important biomedical model for studies in toxicology and embryological development. Currently, research is limited using sea urchins as models of how xanthines affect embryonic development. Since the 1980 FDA warning, expectant mothers were advised to refrain from consuming caffeine, a commonly consumed xanthine. Caffeine (1, 3, 7 - trimethylxanthine) is a legally-used drug, heavily consumed daily by adults. Available data on caffeine shows that, in most mammals, caffeine serves as a mild teratogen. Using *Lytechinus variegatus* as a model, the effects of caffeine on embryological development were assessed. Toxicological tests on fluid-phase caffeine exposure were assessed using protocols established by the USGS. Sea urchins (30-40 mm diameter) were fed an experimental feed containing 0, 50, or 200 mg caffeine/kg feed for 16 weeks. Randomly selected urchins were spawned, and their F1 progeny were allowed to develop for 24 hours. Remaining urchins were dissected, and collected tissues were sectioned for histology. Caffeine had no adverse effects on weight gain, but toxicological tests indicate that caffeine significantly increased the rate of development ($P < 0.05$) for embryos whose parents were exposed to dietary caffeine. These data indicate that prenatal exposure to caffeine may have long-term effects on embryological development, the consequences of which are not known. Supported by Mississippi-Alabama Sea Grant Consortium.

CAUSE OF INJURY AND STATUS OF RAPTORS BROUGHT INTO THE REHABILITATION FACILITY OF THE MOBILE COUNTY ENVIRONMENTAL STUDIES CENTER IN MOBILE, ALABAMA. ***Shannon K. Markey*, Dept. of Biology, University of South Alabama, Mobile, AL 36688.**

Increased urbanization, habitat loss, and other ecological threats have caused many raptors to alter their habitat selections into more urban areas. Because of habitat alteration, many raptors are now encountering new environmental hazards. After the population decline that occurred in the mid-twentieth century and the recent recovery (Kirk and Hyslop, 1998), any new environmental hazards pose a significant threat to raptor populations. In this study raptor populations from the Alabama Gulf Coast have been monitored for fluctuations in mortality. Using local wildlife rehabilitation facilities, mortality and injuries have been documented. Many significant changes in the numbers of incoming raptors have been observed. Since 1993, there has been a significant increase in the number of Cooper's Hawks and a significant decrease in the number of Screech Owls admitted to the wildlife rehabilitation facility of the Mobile County Environmental Studies Center each year. With an occurrence rate of 29.7%, the most common injuries observed were those associated with neurological trauma. The goal of this study is to disclose major changes in population trends in the local raptor populations, as well as to determine the major environmental hazards faced by raptors in southwestern Alabama.

CHANGES IN ANTIBIOTIC RESISTANCE PROFILES OF HUMAN E. COLI:2001-2004. ***Stacey E. Lawton* and Brian S. Burnes, Department of Biology, Judson College, Marion, AL 36756.**

Acquired bacterial resistance can be important in public health, raising husbandry, and tracking pollution. For this reason antibiotic resistance patterns of human E. coli, collected from the City of Marion wastewater treatment plant, were monitored through the years 2001 to 2004. The E. coli were isolated using ColiScan plates and profiled for resistance to a number of antibiotics. A total of 384 E. coli were tested for each year. Antibiotic resistance decreased for ampicillin by 60%, chorlamphenical by 57%, erythromycin by 43%, neomycin by 38%, oxytetracycline by 40 %, spectinomycin by 64%, streptomycin by 29%, tetracycline by 48%, and vancomycin by 7%. Vancomycin resistance decreased slightly, however E. coli would not be expected to be resistant to Vancomycin because it is a gram positive broad spectrum antibiotic. A total of 112 patterns were seen in 2001, 9 unique patterns were seen and a total of 29 patterns were also seen in 2004.

COMPUTATIONAL AND BIOLOGICAL SCREENING ASSAYS FOR ENDOCRINE DISRUPTORS. *Jonathan Catrett* and Philip D. Reynolds, Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.

Endocrine disruptor chemicals (EDCs) are molecules that interact with and interrupt normal hormone-receptor signal transduction pathways. EDC exposure has been linked to detrimental changes in reproductive health and increases in reproductive diseases such as prostate cancer. Numerous chemicals ranging from pesticides to plasticizers have shown endocrine disrupting effects in both cellular and animal-based systems. Current experimental assays are accurate but are limited to studies on only a small number of molecules. With the use of potential EDCs growing rapidly in agricultural, industrial, and consumer products, the need for high-throughput screening is essential in identifying chemicals that are potentially harmful to the reproductive health of both humans and wildlife. In this report, a computational model was developed using pharmacological docking software to predict small molecule interactions with the androgen receptor, a hormone-receptor system that regulates male reproductive development. The hormone binding domain of the androgen receptor crystal structure was used with testosterone as the reference hormone. Several hormones, inhibitors and EDCs known for their ability to bind to the androgen receptor were tested in the computational model to see if the software could accurately predict their binding characteristics. The predictions were then compared to biological data using a new luciferase-based reporter gene assay in HeLa cells. The results indicate that receptor docking predictions may provide a primary screening tool to efficiently and accurately screen large numbers of chemicals for interactions with the androgen receptor.

Corynebacterium jeikeium Growth and Protein Expression When Studied in Serum. *Rusty L. Yates*, Nazia Mojib, and Asim K. Bej, Department of Biology, University of Alabama at Birmingham. Birmingham, AL 35294.

Corynebacterium jeikeium is a gram positive, opportunistic pathogen that could cause blood born infections including bacteremia, septicemia, and endocarditis; primarily in immunocompromised individuals having had open heart surgery. The growth response of this pathogen in medium with 10% (vol/vol) calf serum displayed a doubling of cell density within a 3 hour (h) period when compared to medium without serum. The growth response of C. jeikeium in 10% (vol/vol) human serum supplemented medium displayed an increase in cell density of more than two and a half times that of medium without serum after 2 h of growth. At 3 h of growth, *C. jeikeium* grown in medium with 10% (vol/vol) human serum had increased in cell density to almost four times the cell density of culture grown in medium without serum. An investigation of divalent cations that may be essential for growth in serum indicated Mg^{2+} could be necessary for the cell density increase of *C. jeikeium* when grown in medium supplemented with serum. Following serum induced growth with medium supplemented with serum, total cellular proteins were radiolabeled and analyzed. Differential expression of at least two proteins, approximately 36-kDa (CSIP36) and 45-kDa (CSIP45), respectively, were observed. CSIP36 was found to be unique when compared to NCBI protein database after N-terminal microsequencing. The elevated expression of proteins of *C. jeikeium* when in serum is suggested by these results to possibly be necessary for a rapid increase in cell density during infection of a host's blood stream.

Creation of Neoplastically Transformed Human Mammary Epithelial Cells and Analysis of the Transcriptional Regulators of the human telomerase reverse transcriptase (hTERT) gene. ***Tyson DeAngelis*, Yuanyuan Li, Anna Pendleton, Trygve Tollefsbol, University of Alabama at Birmingham. Birmingham, AL 35294.**

Human mammary epithelial cells can be induced to undergo a transformation to a neoplastic phenotype, through the viral mediated introduction of three genes SV40 ER, hTERT, and an oncogenic form of hRAS, hRASv12. This system provides us with the ability to study the very early stages of tumorigenesis in real-time. The human telomerase reverse transcriptase (hTERT) gene codes for the catalytic subunit of telomerase and its upregulation provides cancer cells with the ability to replicate indefinitely. The cause of the aberrant increase in hTERT expression in cancer cells has yet to be explained. Transformed HMECS (T-HMECs) that stably express all three genes display many, if not all of the characteristics of cancer cells, including the cancer-specific upregulation of endogenous hTERT. Careful analysis of the multiple transcription factors that have been shown to regulate hTERT has helped us to begin to elucidate the cause for the cancer specific upregulation of hTERT in breast cancer.

DETERMINATION OF SEDIMENT LOADING AT UNPAVED ROAD CROSSINGS IN SOUTHEASTERN ALABAMA. ***Suman Chitrakar*, Neil Billington, and P. Michael Stewart, Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.**

Unpaved road crossings have been a dominant source of sedimentation causing degradation of water quality and deterioration of aquatic habitat in southeastern Alabama streams. However, quantitative data on sediment loading at unpaved road crossings in this region are still limited. There is urgent need to quantify sediment delivery at unpaved road-stream crossings. Recently, a sediment risk index (SRI) for assigning risk of sediment loading at unpaved road-stream crossings has been developed at Troy University. This index will be used to identify 10 high risk and 10 low risk stream crossings, determine major variables that govern sediment production at these crossings, and quantify actual sediment delivery into the stream. Aluminum nails and rebar were used to gather data on sediment loading following rain events, along with rain gauges to determine precipitation. For a precipitation event of 20.32 mm, sediment loading ranged from 0.25-1.27 cm in a preliminary survey. Quantifying sedimentation will permit more focused and effective management practices to maintain stream water quality in the watershed.

Distribution and Habitat Characteristics of the Confederate Daisy, Viguiera porteri, In the Valley and Ridge Province of Alabama *David M. Frings*, Department of Biology, Samford University, Birmingham, AL 35229.

Viguiera porteri is documented in the literature as growing in xeric habitats on granitic outcrops in Georgia and extreme eastern Alabama. Local botanists have known that a population of *V. porteri* occurs in a similar xeric habitat founded on sandstone at Oak Mountain State Park. The extension of the range of the species to the Valley and Ridge Province of central Alabama has not been established in the literature. The xeric outcrops that support the population of *V. porteri* at Oak Mountain State Park are formed on Pennsylvanian age, sandstone outcrops. This investigation compares the characteristics of the habitat of *V. porteri* at Stone Mountain, Georgia to those found at Oak Mountain State Park in order to determine the habitat conditions that are required to support the population. Parameters that were investigated include the rock type, soil characteristics, soil pH, elevation, and exposure to sunshine. Since *V. porteri* is restricted to xeric outcrops, topographic maps were used to locate additional areas that contain similar habitats and may support new populations. Two areas investigated were Moss Rock Preserve on Shades Mountain in Hoover, Alabama and Bald Rock Mountain in St. Clair County, Alabama. A new population of *V. porteri* was located at Bald Rock Mountain in St. Clair County, Alabama. No population was found at the Moss Rock Preserve in Jefferson County, Alabama. The field investigation shows that *V. portersi* requires a xeric habitat with a minimal amount of soil. Soils encountered were either derived from the weathering of granite or sandstone, were very sandy, and had an acidic pH. Plant populations were robust in areas that had a southern exposure to full sunshine. No plants were observed at elevations lower than 900 feet above mean sea level which may be the reason that *V. porteri* was not observed at the Moss Rock Preserve.

EFFECTS OF DIETARY ZINC ON GROWTH AND REPRODUCTION OF THE SEA URCHIN, LYTECHINUS VARIEGATUS. *Kimberly N. Trawick*, Jessica E. Etling, Addison L. Lawrence, Stephen A. Watts, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.

Development of sea urchin feeds for sea urchin aquaculture requires evaluation of proximate constituents as well as other important macro- and micronutrients. Despite the production of a large calcite test, mineral requirements have not been determined for any species. This study examined the effects of dietary zinc on organismal and organ weight gain. Adult sea urchins (26.6 g wet wt.) were separated randomly into different treatment groups (n = 18 individuals per treatment), and were fed one of seven formulated feeds that were supplemented with different levels of dietary zinc (4.5, 10.75, 26.32, 65, 161.7, 403.2, 1005 ppm, final concentration). After nine weeks, the sea urchins were dissected and wet and dry weights of the organs were determined. Dietary zinc did not significantly affect the test or gut growth. The formulated feed without zinc supplementation resulted in reduced gonad weight gain. Moisture content was reduced in those individuals, suggesting a difference in proximate composition. These data indicate dietary zinc is required for gonad production. Sea urchins fed 1005 ppm zinc had a significantly smaller lantern, which suggests high levels of dietary zinc are toxic. Supported in part by Mississippi-Alabama Sea Grant Consortium.

Evaluating Androgenic Steroids using Xiphophorus helleri. ***Robert R Parrish*****, Joesph M Hales, Jon Hopper, and Tomas E. Denton, Department of Biology, Auburn University Montgomery, Montgomery, AL 36124.**

Male swordtail fish (genus Xiphophorus) possess a long, colored extension of the caudal fin. This trait, seen only in the male fish, is an example of sexual selection. Immature males are swordless but develop the sword extension during the sexual maturation process. During maturation, the male swordtail fish have an increase in testosterone levels, which leads to the development of the caudal fin extension, commonly referred to as the sword. Although this trait is not seen in normal female swordtail fish, many previous studies have reported female swordtails being transformed into phenotypic male fish by the administration of male sex hormones. In this study, female swordtails were exposed to four different C-19 steroids over a fourteen-day period: two adrenal steroids and two testosterones. All four of the drugs produced caudal fin transformation with no sign of regression long after exposure to the drugs ceased. The effectiveness of the different steroids was measured against each other and a control. The steroids containing double bonds in their A rings typically appear to be more potent, causing greater numbers of caudal fin transformation than the steroids with a single bond in their A rings. One synthetic steroid, known as delta 1-adrenosterone, was tested and found to be equally as potent as delta 1-testosterone in caudal fin transformation. This delta 1-adrenosterone is unreported in any living species, and is therefore considered newly introduced into a living species.

FACTORS LEADING TO CANNIBALISM IN LAB-REARED LYTECHINUS VARIEGATUS (ECHINODERMATA). ***Cristina M. Richardson*****and Stephen A. Watts, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.**

Sea urchins are prized for their gonads, or uni, that are eaten as sushi in Asian and Mediterranean countries, as well as for their use as an important biomedical model for research. Their successful aquaculture has become vitally important in recent years as natural populations have been depleted by overfishing. Recent observations indicate that, when held in captivity en masse, adult *L. variegatus* will cannibalize other *L. variegatus* in the tank. Individuals consumed showed no signs of injury or disease. Cannibalism occurred when a predatory urchin first consumed the spines of a conspecific prey urchin, usually on the aboral surface, and then proceeded to break the test and consume completely the test and other organs. Cannibalistic behavior has recently been observed in dense populations of developing juveniles. In this study, juvenile *L. variegatus* (< 2mm diameter) were placed in small finger bowls and observed for up to two weeks. Individuals were not fed during the two-week period. Previously-starved juveniles showed minimal cannibalism when held at densities of either 1600/m^2 or 1000/m^2 (<7 %). Cannibalism increased to 23% in juveniles fed previously and then transferred to finger bowls for two weeks at 1600/m^2. We suggest that nutritional history, size, and density will contribute to the rate of cannibalistic behavior in cultured sea urchins. This is the first report of conspecific cannibalism in any sea urchin species.

GENETIC VARIATION IN WALLEYE POPULATIONS. ***Sonia D. Lyle*** **and Neil Billington, Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.**

Walleye (*Sander vitreus*) (Percidae) is a large predaceous fish species that is common in Canada, and the mid-west and Great Plains region of the U.S. These fish are intensively managed because they are popular with anglers. Thus, information on the population genetic structure of walleye will be useful in their management. Cellulose acetate gel electrophoresis was used to screen genetic variation in 1188 walleye from nine populations. Two polymorphic protein-coding loci in walleye, malate dehydrogenase (*sMDH-3*) and general muscle protein (*PROT-3*), were surveyed. Five populations showed significant deviations from Hardy-Weinberg expectations at *sMDH-3* and three populations showed significant deviations from Hardy-Weinberg expectations at *PROT-3*, all due to heterozygote deficits. This was likely caused by the Wahlund effect because most samples were collected during the summer and fall, a period when walleye are highly mobile, rather than during the spring when they are presumed to segregate into discrete spawning aggregates. Highly significant among population heterogeneity was found for walleye at both *sMDH-3* and *PROT-3*, suggesting a high degree of differentiation among walleye populations. Managers are encouraged to manage walleye populations that are genetically distinct separately, because these populations may exhibit local adaptations. Mixing such populations might lead to outbreeding depression.

HYBRIDIZATION BETWEEN WALLEYE AND SAUGER. ***Rachael N. Koigi,*** **Janet Gaston, Neil Billington, Ronald E. Creech, Amy M. Wotawa, and Sonia D. Lyle. Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.**

Walleye (*Sander vitreus*) and sauger (*S. canadensis*) (Percidae) are both large predatory fishes that hybridize naturally and their F_1 hybrids backcross with both parental species leading to introgression. We examined 5385 fish collected from 15 populations in the Great

Plains (8 populations) and the mid-west (7 populations) where both species co-occur. Four diagnostic protein-coding loci (*ALAT* and *IDDH* from liver, and *mMDH-1* and *PGM-1* from muscle) between the two species were screened by cellulose acetate gel electrophoresis to determine the proportion of hybrids (fish possessing alleles of the other species) in each population. For the Great Plains populations, no hybrids were found in two Wyoming populations, hybrids ranged from 2.8-11% in five Montana populations and 2.7-10% in potential Montana sauger brood stock, while in Lake Diefenbaker, SK, Canada, 17.1% of fish were hybrids. For the mid-west populations, 20.4% of sauger from Lake Sakakawea, ND, contained walleye alleles, whereas in South Dakota 4.2% of fish from Lake Sharpe, 3.9% from Lake Francis Case, and 21% from Lewis and Clark Lake were hybrids. In addition, 22.7% of fish from the Mississippi River Pool 13 (IA) were hybrids, 30% of fish from Ombabika Bay, Lake Nipigon, ON, Canada, and 4.1% of fish from the Illinois River and 1.9-4.1% of potential sauger brood stock fish were hybrids. Managers need to take hybridization into account when selecting brood stock from these water bodies.

MASCULINIZING POTENCIES OF METHYLTESTOSTERONE AND SPIRONOLACTONE IN FEMALE WESTERN MOSQUITOFISH, GAMBUSIA AFFINIS.

***Samiksha Raut*, Robert Angus, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.**

There is a growing concern regarding presence of anthropogenic compounds in the environment that can act as endocrine disruptors. Among such endocrine disrupting compounds, estrogens have been extensively studied. Although reports of androgenic endocrine disruptors continue to increase, this class of compounds has not been well studied. We are currently investigating the effects of the potent synthetic androgen methyltestosterone (MT) and aldosterone inhibitor spironolactone (SPL) on an androgen-dependent secondary sex characteristic (gonopodium) in female western mosquitofish, *Gambusia affinis*. Females were exposed for five weeks to MT (10-10000ng/L) and SPL (10-500nM) by using the static renewal method. Morphological masculinization as evidenced by the development of an elongated and modified anal fin was observed in the three highest exposure groups in both MT and SPL treated females. However, in the MT treated females, the anal fin ray elongation was completed by the second week of exposure along with the development of hooks and spines. On the other hand, SPL treatment resulted in increasing the anal fin ray length until the second week of exposure and showed the development of hooks and spines after three weeks. These results indicate that the potent masculinzing agent MT causes masculinization more rapidly than SPL. Further these results also confirm earlier studies indicating the androgenic mode of action of SPL in female mosquitofish in contrast to its anti-androgenic effects observed in humans. This work supported by AAS student research grant 2007.

Mesofauna Associated with the Subtropical/Tropical Marine Sponge Amphimedon viridis: Are Faunal Associations Likely to Provide Refuge from Fish Predation Due to Physical or Chemical Feeding Deterrent Properties of this Sponge? ***Jonathan Huang*, James B. McClintock, Charles D. Amsler and Yusheng Huang, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.**

Sessile benthic marine organisms such as sponges are frequently colonized by a wide diversity of invertebrates. The present study focused on a quantitative analysis of the mesofauna associated with the common subtropical/tropical sponge *Amphimedon viridis* and explored several criteria for the basis for this mesofauna-sponge relationship. Specimens of *Amphimedon viridis* were hand-collected individually in bags from both Saint Joseph Bay, Florida Panhandle, and Sugar Loaf Key, Florida Keys between April - November 2006. Quantitative analyses of sponge surfaces and interiors revealed that the most common sponge-associated group was comprised of amphipods, followed by polychaetes and tenaid crustaceans. 35 percent of sponge-associated individuals were recovered from the interstices of the sponge. A total of 707 individuals per 1 cm^3 of sponge material were found within 15 sponge samples of A. viridis. Shannon diversity and evenness indices indicated that A. viridis supports a diverse community of sponge-associated invertebrates including amphipods, polychaetes, tenaids, decapods, and isopods. These sponge-associated invertebrate groups may occupy sponges for a number of reasons. For example, physical or chemical protection from fish predation may impose a strong selective pressure that sustains these relationships. Moreover, nutritional needs, reproductive behaviors, and social interactions could also contribute to these sponge associations. In order to evaluate whether *Amphimedon viridis* provides a refuge from predation for sponge-associated mesofauna, laboratory feeding experiments were conducted to assess the palability of A. viridis to the generalistic sympatric pinfish Lagodon rhomboides. In feeding assays employing small pieces of sponge tissue and control squid tissue, pinfish displayed a strong significant rejection for sponge tissues when compared with control squid tissues. Alginate food pellets loaded with ecologically relevant concentrations of spicules isolated from A. viridis caused a weak but significant deterrent response in pinfish when compared to food pellets lacking spicules. However, alginate food pellets containing tissue-level concentrations of lipophilic and hydrophilic sponge extracts were highly deterrent to pinfish when compared to control food pellets. It is concluded that while both physical and chemical characteristics of A. viridis may contribute to its quality as a habitat resource, potent secondary metabolites, likely halotoxins and amphitoxins, play a particularly important role in providing a chemical refuge for associated mesofauana.

MICROBIAL LOAD OF SELECTED COLLEGE PROFESSORS. ***Diane M. Jowers*, Tia McClenney, Genevieve Russell, and Brian Burnes, Biology Department, Judson College, Marion, AL 36756.**

Samples from the mouths of selected faculty and students of Judson College were collected and identified to compare the microbial loads with respect to age, gender, smokers vs.

nonsmokers, academic compartments, illness, hand washing habits, oral hygiene habits, contact with children, and gum chewing. Mouth swabs were taken and plated on Nutrient Agar and incubated at 37 degrees Celsius. The bacterial colonies were observed for numbers, morphology, gram stain, and Enterotube II results. Plate counts ranged from 1 to 2048 bacterial colonies, morphology included cocci and bacillus, and gram stains indicated both positive and negative bacteria. In conclusion, higher numbers of Gram positive cocci were present in members of the Biology department than members of the Education, Business, and Student Life departments, higher numbers of Gram negative cocci and Gram positive Bacillus were present in Education department members than Biology, Business and Student Life members, higher microbial loads were present in nonsmokers than smokers, and a higher number of males presented Gram positive spreading colonies than females. There was no direct correlation between hand washing habits and oral bacteria.

MITOCHONDRIAL DNA MARKERS FOR IDENTIFYING SOUTHERN AND NORTHERN STRAINS OF ALABAMA WALLEYE. *Amy M. Wotawa* and Neil Billington, Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.

Walleye (*Sander vitreus*) (Percidae) from the Mobile drainage of Alabama are rare, but genetically distinct from Tennessee River walleye populations. Early work based upon whole-molecule mitochondrial DNA (mtDNA) analysis showed that the northern strain and the southern strain (sometimes called the Gulf Coast strain) are separated by a sequence divergence of 2.36% meaning that they likely diverged approximately 1 million years ago. Because numbers of the southern walleye are declining we sought to find a non-lethal way of being able to determine differences between northern and southern walleye mtDNA in Alabama. A search of published D-loop sequence data from both strains revealed three restriction site changes in this region that could be revealed by PCR-RFLP analysis with four-base recognition endonucleases. Two site gains were detected in the southern strain compared to the northern strain for *Rsa* I and a site loss in the southern strain compared to the northern strain was found for *Tru9* I. We intend to use these markers to identify northern and southern walleyes in Alabama by PCR-RFLP analysis. This should allow females of the southern walleye strain to be confirmed by genetic analysis prior to them being used in conservation breeding programs.

NECROPSIES OF CETACEANS AND THE COURTS. *Gerald T. Regan* 4000 Dauphin Street, Mobile, AL 36608-1791.

The National Marine Fisheries Service administers the Marine Mammal Stranding Network. For 20 years there has been a participant from Alabama in that network. An important part of that participation has been the preparation of specimens and data that would be recognized in court cases involving allegations of violations of the Marine Mammal Protection Act of 1972 as amended. Alabama participants studied books on that subject and participated in half a dozen in-service workshops. Four hundred and forty-three dead or dying dolphins, whales, and manatees came under the scrutiny of Alabama participants. Most of them underwent necropsy. But no data or specimens were used by any court in arriving at a decision. That raised the question of what had happened in other states. A pilot study of the past 20 years of such records as are available to Academic LexisNexis showed that only one case had been decided on the basis of information from necropsies. Beaked whales had died in the Gulf of California after airguns had been used by Columbia University. The magistrate of a California district court ruled that there would be a temporary injunction against the use of the airguns based on necropsy data from several different species of cetaceans that died in association with the Navy's use of SONAR near the Bahamas. The necropsies showed that there had been irreparable harm to the ears and lungs. Spring Hill College, the Marterra Foundation, and the Prescott grant program assisted work mentioned in the report above.

OBSERVATIONS OF GROWTH IN NEWLY-METAMORPHOSED JUVENILE LYTECHINUS VARIEGATUS (ECHINODERMATA: ECHINOIDEA).

***Jessica E. Etling*, M.L. Powell, A.L. Lawrence and S.A. Watts. Department of Biology, University of Alabama at Birmingham, Birmingham AL 35294.**

Sea urchins are excellent biomedical and toxicological models, as well as a popular food among many people. However, sea urchin populations are being decimated by overfishing. Due to this high demand, there is an increasing need to develop methods for inland rearing of sea urchins from the larval to the adult stage. Sea urchin larvae transition from free swimming larvae feeding on unicellular algae in the water column to a benthic environment. Little is known about juvenile nutritional requirements at this early developmental stage. Feeding in newly metamorphosed juveniles was examined in settled sibling larvae collected from a single male and female spawn and placed in duplicate 8 L aquaria. Newly-metamorphosed urchins were placed in one of four treatments: Biofilms of the live diatom Amphora helenensis, A. helenensis plus diatomaceous earth, A. helenensis with a diatom substitute (ReedMariculture Inc.), and the diatom substitute alone. Individual growth was highly variable within all groups, with a range in diameter from 0.4mm to 3.0mm. Survival was comparable among the first three treatment groups, however, no individuals survived when fed diatom substitute alone. Supported in part by Mississippi-Alabama Sea Grant Consortium.

OPTIMIZATION OF A DISCRIMINANT FUNCTION FOR MICROBIAL SOURCE TRACKING.

Brian S. Burnes, Department of Biology, Judson College, Marion, AL 36756.

A potentially inexpensive method for determining the sources of pathogenic microbial contamination of surface and drinking water is to apply discriminant function analysis to antibiotic-resistance patterns. E.coli from Humans, Cattle, or Deer were collected, isolated, and tested for growth in the presence of various antibiotics (ampicillin, chloramphenicol, erythromycin, neomycin, oxytetracycline, spectinomycin dihydrochloride, streptomycin sulfate, and tetracycline hydrochloride) and these results were used to develop discriminant functions that correctly categorized E.coli of unknown origin with high accuracy. A

discriminant function that classified E.coli into all 3 groups had an average rate of correct classification of 78%, whereas a discriminant function that classified E.coli into just two groups, human or nonhuman, had an average rate of correct classification of 90%.

PACIFIC SANDS: THE QUEST FOR LIFE. Karl Fernandez, Angela Smith and *George Williams*, Athens State University, Athens, AL 35611.

Sands are deposited around the world on oceanic beaches, deserts, dunes, and sand bars of riverine environments. Transport media for sands include water, wind and ice. Sand is a vital component in marine ecosystems. Sands are formed from many sources including fast flowing rivers, mountains, volcanoes and several types of organic materials. We are especially interested in beach sands and those that contain tests, shells, and skeletal fragments of living organisms. We carefully examined several sands from the Pacific, with a few others for comparison, to determine characteristics of each and the approximate fraction and types of organic materials within the selected specimens. Sands from the Hawaiian Islands, California, Fiji, Kwajelein, the Marshall Islands, Guam, Pago Pago, Utah, and the Galapagos Islands were included in this study. Samples were carefully studied microscopically and photographed for colors, surface texture and degree of grain sorting. Sand grains were measured to determine size ranges, weighed, and tested for organics and magnetite. We found sands from Hawaii, Kwajelein, Fiji, the Marshall Islands, Guam, Pago Pago, and the Galapagos Islands are almost one hundred percent organic in origin. They include grains and fragments from corals, foraminiferan tests, gastropod shells, bivalve shells, sponge spicules, fossiliferous fragments, crinoids, sea urchin spines, and others.

Preservation of a Mature Canopy Floodplain Hardwood Forest: Perry Lakes Park and Environs *Lauren Stephens*, *Angi Gullard*, *Tonya Morgan*, *Riki Enzor* Judson College Earth Team - Dr. Thomas Wilson, Leader. Judson College, Marion, AL 36756.

Preservation of a Mature Canopy Floodplain Hardwood Forest: Perry Lakes Park and Environs Perry Lakes Park and associated Barton's Beach and the Marion State Fish Hatchery woods make up 900 acres of Cahaba River mature canopy floodplain forest. This rare and valuable bottomland ecosystem is being developed into a nature preserve, outdoor laboratory, research center, recreational area, and ecotourism attraction. This area represents a major birding destination second in importance only to Dauphin Island. The Park's 100-foot tall canopy tower allows a new approach to birding and to the study of trees. The wet areas are home to Swamp and Water Tupelos, Bald Cypress, Blackgum and Overcup Oaks. The numerous mature and dying trees create a prime habitat for large numbers of woodpeckers, especially the Pileated Woodpecker. The birding list for the Park is over 207 species. The Park was created in 1999 by a 20 year lease from the Alabama Department of Conservation and Natural Resources. There is a strong movement by Friends of Perry Lakes Park to have the Department of Conservation develope a management plan that designates the Park and Marion Fish Hatchery woods as a State Natural Area similar to a Federal Wilderness. It is important that this wonderful and threatened ecosystem be preserved in its natural state for the wellbeing of wild creatures including beautiful trees and plants. It is important for all of us that we realize that we can save and preserve some parts of nature for future generations. We thank Dr. Thomas Wilson, Judson College Biology Professor for leading the Earth Team in this project.

Spectacular Specimens in a Speck of Sand ***Angela Smith*****, Karl Fernandez, George Williams Athens State University, Athens, AL 35611.**

Sand is a substance on which many do not dwell. When you think of sand, you think of some dirt-like substance found at the beach or in a desert. Not much thought is given toward the composition and make-up of sand, or to the organic material that can be found in sand. The purpose of this study was to examine the life forms found in sands from around the Atlantic Ocean. Ten sands were chosen for the study and comparison. We carefully examined several sands from the Atlantic, to determine the characteristics of each and the approximate fraction and types of organic materials within the selected specimens. Samples were carefully studied microscopically and photographed for colors, surface texture and degree of grain sorting. Sand grains were measured to determine size ranges, weighed, and tested for organics and magnetite. This study shows how sands from various points around the Atlantic can be so similar and so different. The sands used in this study were from Connecticut, Florida, the Bahamas, Ireland, Spain, France, Greece, and Africa. Results showed that the majority of the sands studied did contain some life forms. In just a speck of sand, so many specimens can exist. The life forms ranged from coral fragments, to mollusk shells, sea urchin spines, sponge spicules, gastropod shells, and foraminiferan tests.

STATUS OF THE SANDHILL CRANE, SNOW GOOSE AND CANADA GOOSE ON WHEELER NATIONAL WILDLIFE REFUGE, DECATUR, AL. ***Todd Cook*** **and George Williams, Athens State University, Athens, AL 35611.**

Wheeler National Wildlife Refuge has been a haven for migratory and resident birds since its establishment in 1938. The refuge staff maintains careful records of bird populations. Species numbers are determined each winter by actual ground counts and aerial surveys. We studied these data to determine the changes in numbers for the sandhill crane, Canada goose and snow goose. The sandhill crane surveys verify a steady increase in numbers at Wheeler from twenty-six in 1997, to a peak of 2,564 in January of 2008. Numbers of the Canada goose indicate a decline from a high of 58,000 in the winter of 1963-1964, to a low of 1,153 in the 2006-2007 season. The snow goose numbers range from a low of 100 in 1948-1949, to 2,800 in the winter of 1999-2000. The steady rise in the numbers of the sandhill crane may be due to their preference to winter farther north in recent years. The Canada goose numbers have declined possibly due to a combination of the loss of habitat in Southern James Bay, predation, hunting, and short-stopping to areas north of Wheeler. The snow goose population at Wheeler each winter has been the most consistent of the three species.

STEROID HORMONE LEVELS AND THEIR IMPLICATIONS FOR OVERALL REPRODUCTIVE PHYSIOLOGY IN THE DIAMONDBACK TERRAPIN, MALACLEMYS TERRAPIN.

***Andrew T. Coleman*, Thane Wibbels, Ken Marion, Univ. of Ala. at Birmingham, Birmingham, AL 35294. Willem Roosenburg, Ohio Univ., Athens, OH 45701. David Nelson, Joel Borden, and Gabe Langford, University of South Alabama, Mobile, AL 36688.**

Previous studies that examined reproductive steroid levels in other turtle species have contributed to the elucidation of certain physiological and ecological aspects such as reproductive activity, stress levels, and sex ratios. The diamondback terrapin, *Malaclemys terrapin*, is the only turtle in North America that exclusively inhabits the brackish environments of bays and estuaries. This species faces numerous threats throughout its range, so it is imperative to have a thorough understanding of factors relating to its reproductive physiology. In the current study, blood samples were obtained from two geographically separated populations, both of which are believed to be in decline. Testosterone and estrogen levels were measured via radioimmunoassay (RIA), and the seasonal cycles of these reproductive steroids were examined. Adult females showed a gradual decrease in testosterone over the nesting season, while adult males showed a gradual increase. No significant differences were observed in estrogen levels between gravid and non-gravid females. The results provide insights, which will be discussed, into the endocrine physiology underlying the reproductive cycle in the terrapin. This research was funded through grants from the Alabama Department of Conservation and Natural Resources and the Alabama Academy of Science.

STUDY OF DIFFERENTIALLY EXPRESSED PROTEINS IN ANTARCTIC BACTERIA AT COLD TEMPERATURE.

***Nazia Mojib* and Asim K. Bej, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.**

Several factors are involved in the mechanism of bacterial adaptation to low temperatures and one of them includes the production of Ice Binding Protein (IBP) which is well documented in snow mold and sea ice diatoms. In our study, various bacterial species from Antarctica, which survive at subzero temperatures were screened for the expression of IBP. Since IBP (25 kDa) from sea ice diatom Navicula glaciei show considerable similarity to psychrotolerant sediment bacteria, Rhodoferax ferrireducens (58% identity) and a denitrifying estuarine bacteria, Shewanella denitrificans (43% identity), polyclonal antibody raised against a conserved middle domain of IBP was used for detection of IBP in Antarctic bacteria. Out of 11 different microorganisms screened, 7 exhibited a single protein band ranging between 20 kDa and 30 kDa. Interestingly, IBP-like protein was also identified in the selected Antarctic pseudomonads which have previously been reported to produce ice-active and cold acclimation CapB protein. Degenerate PCR strategy was used to amplify IBP from Pseudomonas 30-3. There was marked elevation in the expression of IBP in Pseudomonas 30-3 at low temperatures (0°C and -5°C). This suggests that IBP may be one of the factors contributing to survival mechanism at low temperatures. Microscopic examinations to confirm the viability of these bacterial cells both at low and

high temperatures using Molecular Probes Live/Dead Bac-Lite fluorescent stain exhibited live and actively growing bacteria at all stages. Further investigation of the structure and function of IBP will help understand the mechanism of adaptation of Antarctic bacteria at sub zero temperatures.

SURVEY OF AEROSPORA AT DIFFERENT HEIGHTS: QUALITATIVE AND QUANTITATIVE ASSESSMENT. Marian Wehby and *H. Wayne Shew*, Birmingham-Southern College, Birmingham, AL 35254.

Airborne pollen and fungal spores are a leading cause of allergies. Air samples collected at certified pollen stations are used to count numbers and types of pollen and fungal spores, and these counts are used by allergists to predict the greatest risk for pollinosis in individuals due to the presence of a particular aeroallergen. Currently, official, reported pollen counts are determined using pollen collectors located on roof tops (at a height of 12-20 m). Studies in Spain, Italy, and Northern Europe have shown significant differences in the amount of pollen present at different heights, but a similar study has not been performed in the United States. This study was undertaken to determine whether air samples taken at ground level, eye level (1.5 m), and roof level (13 m) show significant differences in the concentration and types of pollen and fungal spores. Samples were collected on silicone coated microscope slides during October, November, and December 2007, and January 2008, using a Burkard volumetric air sampler. Samples were mounted in glycerin jelly containing phenol and basic fuchsin, and examined with light microscopy. The results were statistically analyzed using an unpaired two-tailed t-test. Preliminary results indicate that there are significant differences in types and number of fungal spores per m^3 at different heights. Very low pollen counts during the months in which samples were taken prevent any definitive statement about the effect of sampling heights on pollen types and number per m^3.

THE EFFECT OF DIETARY CALCIUM ON ZEBRAFISH (DANIO RERIO) GROWTH, SURVIVAL, AND BONE MINERAL DENSITY. *Steve Padgett-Vasquez*, Anthony J. Siccardi III, Lou R. D'Abramo, Stephen A. Watts, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.

Osteoporosis affects one third of women over the age of 65. It has been studied extensively in human and animal models. Zebrafish (Danio rerio) may be an excellent bone model because of lamellar structure and hierarchical organization (levels one through seven) similar to human long bones. Calcium is the most abundant mineral in the human body. It is present in both intra and extracellular fluids, but it is most abundant in the bone. Juvenile, reproductively-intact zebrafish from day 28 through 112 post-fertilization were used in two separate scenarios due to their natural ability to sequester calcium through their gills. One group was placed in RO filtered water lacking calcium (approximately 0 ppm) and were fed 0, 2, 4, 6, or 7.7 mg/g feed of calcium carbonate. The second group used filtered tap water that contained calcium in the water (approximately 25 ppm) and were fed 0, 2, 4, or 6 mg/g feed of calcium carbonate. After the twelve week study there were no significant differences in weight, length, survivorship, or bone mineral density (determined by micro CT) of any treatment groups, regardless of calcium in the water.

WHOLE-CELL SACCHARIFICATION OF LIGNOCELLULOSES, *Benedict C. Okeke*, Department of Biology, Auburn University Montgomery, Montgomery, AL 36124.

Fossil fuel is expensive and nonrenewable. Inedible plant materials such as wood chips, wood shavings and grass are abundant renewable natural resources that can be transformed to biomass fuel. Plant materials are composed largely of lignocelluloses which are complex polymers of cellulose, hemicelluloses and lignin. Cellulose, a linear glucose polymer, is the principal structural polysaccharide in plant fiber. Hemicelluloses are heteropolymers of a range of pentose sugars, primarily xylose and arabinose. Cell-free enzymes have been widely studied for lignocellulose saccharification. A major limitation of cellulose breakdown to fermentable sugars is incomplete mixture of enzymes and instability of extracted enzymes. Use of whole-microbial-cells has the advantage of secretion of a wide spectrum of synergistic enzymes required for complete degradation of lignocelluloses. This paper presents the development of a process for whole-cell saccharification of lignocelluloses for production of biomass fuel.

ROAD-KILL SURVEY OF ALABAMA RED-BELLIED TURTLES ON THE MOBILE BAY CAUSEWAY. *David H. Nelson* and Cynthia Scardamalia-Nelson, Department of Biological Sciences, University of South Alabama, and Providence Hospital, Mobile, AL 36688.

A systematic, road-kill survey was conducted (by bicycle or automobile) on the Mobile Bay Causeway from April 2001 to December 2007 to assess the numbers of Alabama red-bellied turtles (*Pseudemys alabamensis*) killed by automobile traffic. A federally endangered species, Pseudemys alabamensis has been designated as the official "Alabama state reptile." A total of 553 Alabama red-bellied turtles were recorded over the seven-year study: 420 hatchlings, 116 adult females (most gravid), 13 juveniles, and 4 males. A majority of hatchlings (96%) over- wintered in the nests to emerge during the following Spring (March-May). Fewer numbers of hatchlings (4%) emerged during the Fall (October and November) of the same year. Direct hits by hurricanes apparently resulted in fewer roadside mortalities of hatchlings (as they were drowned or emerged prematurely). The mortality of adult females (N=116 was greatest (92%) during the nesting season: May, June, July. Each year, from 5 to 34 nesting females, mostly gravid (mean = 16.6), were killed by vehicular traffic on the road. Because of the limited availability of favorable nesting sites in the lower delta, gravid females are apparently attracted to the shoulders of elevated roadsides where they deposit eggs (and may incur mortality). A chain-link fence is currently being installed by the Alabama Department of Transportation to reduce the road-side mortality of turtles along the Mobile Bay causeway. Partial funding was provided by the Alabama Department of Conservation & Natural Resources and the U. S. Fish and Wildlife Service.

Phototactic Responses of Larvae from the Marine Sponge Xestospongia proxima.

***Andrew S. Mobley*, Department of Biology, University of Alabama at Birmingham, USA. Linnet Busutil Lopez, Instituto de Oceanologia, Cuba. Sally P. Leys, University of Alberta, Canada. Maria Cristina Diaz, Museo Marino de Margarita, Venezuela. Rachel Collin, Smithsonian Tropical Research Institute, Bocas del Toro Research Station, Panama. Robert W. Thacker, Department of Biology, University of Alabama at Birmingham, AL 35294.**

In August 2007, the Training in Tropical Taxonomy program at the Smithsonian Tropical Research Institute's Bocas del Toro Research Station sponsored a two-week course on the Taxonomy and Ecology of Caribbean Sponges. During the course we examined the phototactic behavior of larvae from the marine sponge Xestospongia proxima. Previous studies suggest that negative phototaxis in sponge larvae is generated by the responsiveness of a tuft of long posterior cilia. While other sponge larvae are known to be positively phototactic, the mechanism by which swimming direction is coordinated in those species is not yet understood. Since X. proxima hosts large populations of photosynthetic, unicellular cyanobacteria, we hypothesized that the larvae would be positively phototactic, and that the ciliary response would be opposite to that of negatively phototactic larvae. We incubated X. proxima larvae in petri dishes, with half of the dish covered by black plastic, and placed a light source over the uncovered half of the dish. Initially, all larvae were positively phototactic; however, the percentage of larvae displaying negative phototaxis increased steadily to 50% after 36 hours. As predicted, larval cilia quickly responded to changes in light intensity, straightening as light diminished, and bending as light increased. These results demonstrate that larvae of diverse sponge species coordinate behavioral responses to light using the same mechanism.

Biological Sciences Poster Abstracts

ANTIBIOTIC SENSITIVITY AND RESISTANCE SURVEY AMONG BACTERIA ISOLATED FROM AEROBIC DIGEST FROM A WASTEWATER TREATMENT PLANT.

***R. Glynn Stephens* and Lisa Ann Blankinship, Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.**

Antibiotic resistance is becoming more prevalent due to the common usages of antibiotics. Pharmaceutical companies are continuously developing new drugs to compensate for this resistance. Therapy regimes are becoming more complicated for physicians to try to combat infections. Bacteria are becoming more and more effective in surviving these treatments via their many mechanisms of DNA transfer and uptake. In wastewater treatment plants, these mechanisms are put to their most efficient use and may include transformation, transduction, and conjugation. Surveillance of resistance patterns has shown that wastewater treatments facilities are an opportune location for the transmission of antibiotic resistance. This project investigated the resistance of isolates from aerobic digest collected from the

Five Mile Creek Wastewater Treatment facility in Birmingham, AL. Seventeen isolates were tested for their susceptibility to thirteen antibiotics. Influent to the aerobic digester and effluent from the aerobic digester was also tested for resistance.

Characterizing the role of NF-kappaB in gliomagenesis. *Jordan A. Beard*, Department of Biological and Environmental Sciences, Samford University, Birmingham, AL 35229. Susan Nozell and Etty N. Benveniste, University of Alabama at Birmingham, Birmingham, AL 35294.

Gliomas are the most common primary tumors of the central nervous system. The World Health Organization categorizes gliomas into four different grades, ranging from least to most aggressive. Because of their diffusely infiltrative nature, gliomas are difficult to detect, resect or treat. As such, patients diagnosed with grade IV gliomas or Glioblastoma, have the worst prognosis with a survival time of less than 12 months. The NF-kB transcription factor is an important mediator of inflammation and immune responses and consists of two subunits, p65 and p50. Although NF-kB is tightly regulated, during an immune or inflammatory response, NF-kB can induce the expression of many genes that regulate the processes of angiogenesis, cell growth, invasion and apoptosis. As such, in cancers, if NF-kB is inappropriately activated, it may contribute to the formation and/or progression of tumors. However, at present, the exact nature of NF-kB in gliomas is unclear and remains to be addressed. Herein, we propose to investigate the role of p65 in gliomagenic behavior. We hypothesize that through NF-kB, gliomas are empowered to grow, invade and evade apoptotic stimuli. To test this, we will use a glioma cell that inducibly regulates NF-kB activity by controlling endogenous p65 levels to analyze the effects of NF-kB on cell growth, invasion and apoptotic resistance.

Chemical defenses against diatom fouling in Antarctic macroalgae: insights from bioassay guided fractionation. *Hamel P. Sevak*1, Margaret O. Amsler[1], J. Alan Maschek[2],Charles D. Amsler1, James B. McClintock1, and Bill J. Baker2 1Dept. of Biology, Univ. of Ala at Birmingham, Birmingham, AL 35294, USA 2Dept. of Chemistry, University of South Florida, Tampa, FL 33620.

The prevention of fouling in marine algae involves complex processes that are not yet completely understood. Some antifoulant activity may be attributable to single compounds, whereas others may require synergetic interactions between collections of compounds. Antarctic marine benthic systems are a particularly relevant habitat for studying diatom antifoulants because benthic diatoms are seasonally extraordinarily abundant. In a previous study, we investigated crude organic extracts of a broad suite of macroalgae from the western Antarctic Peninsula for toxicity against sympatric diatoms. In the present study, we bioassayed specific HPLC-generated fractions of crude extracts from four common macroalgae found in the western Antarctic Peninsula (Georgiella confluens, Desmarestia antarctica, Trematocarpus antarcticus, Gigartina skottsbergii). All species had shown significant activity against diatoms as crude organic extracts but not in feeding bioassays with sympatric herbivores. Diatom viability was measured with live/dead staining (fluorescein diacetate and Evans blue) . Diatoms were exposed to macroalgal extracts at several concentrations (1x, 3x or 10x their calculated natural concentration on a volumetric basis). Bioactivity was not detected at even 10 x in any of the isolated fractions from the macroalgae. However, in all species except Trematocarpus antarcticus, a combination of all the isolated fractions at a 10 x concentration resulted in potent bioactivity with 99% diatom mortality. These findings indicate that in all species, individual compounds are inactive in diatom antifoulant assays. Rather, some as yet unknown combination of individual compounds results in an additive or synergistical biochemical effect that is toxic to diatoms.

EFFECTS OF HERBAL EXTRACTS ON BACTERIA AND HUMAN ADENOCARCINOMA CELLS. Florence Okafor, Tatiana Kukhtarev,*Jennifer Jones*, Leonard Williams & Mostafa Dokhanian. Alabama A&M University, Normal AL 35762.

Cancer is life a threatening disease that affects individuals of all ages. The well-known herb, Aloe vera, may alter the grim perception that accompanies cancer. Aloe vera is said to be effective against some forms of cancer. The purpose of our experiment is to determine if these assertions are correct. CaCO2 cancer cells and Bacteria were exposed to Aloe vera, Garcinia kola and fennel extracts. Escherichia coli and Bacillus thuringiensis were exposed to Aloe vera and Garcinia kola as a pilot study. The bacteria species were grown in Brain Heart Infusion for 48hr to get exponential growth. The microorganisms were then exposed to the herbal extracts and allowed contact times of 30 minutes to one hour at ambient temperature including control plates. Aloe vera inhibited the growth both microorganisms. Garcinia kola had no effect on the growth of the experimental microorganisms. Human adenocarcinoma (CaCO2) cancer cells were grown in Hanks Balance Saline Solution (HBSS). Several plates were prepared including, a low control, a high control, and all were exposed to the experimental herbal extracts. Aloe vera and Garcinia kola caused apoptosis in the CaCO2 cells. Fennel had little or no effects on the CaCO2 cells, indicating that fennel does not cause apoptosis. This preliminary investigation confirmed that Aloe vera leads to programmed cell death in human adenocarcinoma cells.

EPIBRASSINOLIDE (EB) EFFECTS ON THE DEVELOPMENT OF JAPANESE MEDAKA FISH (ORYZIAS LAPTIPES) EGGS. James P. Weaver , B.S., Ryan A. Fogg, B.S., *Ronald N. Hunsinger*, Ph.D., W. Mike Howell, Ph.D. and Ronald L. Jenkins, Ph.D.(Deceased -Spring 2007), Department of Biological and Environmental Sciences, Samford University, Birmingham, AL 35229.

Epibrassinolide (EB) is a recently discovered type of plant steroid. Studies show that hormones like EB impact cell division, cell elongation, and root growth in plants. However, no research to date has been published concerning the effects of EB on animal cells. The purpose of this experiment was to monitor the effects of different levels of EB on developing Japanese Medaka fish embryos. Our results indicated that EB, with respect to controls, caused: 1) an earlier emergence of a heartbeat, 2) an accelerated heart rate, 3) an acceleration of egg hatching, 4) an acceleration of ocular development and 5) an acceleration of vascular development.

GLYCOSYLATION OF HUMAN IGA1: A MASS SPECTROMETRIC APPROACH AND ITS IMPLICATIONS FOR THE DISEASE IGA NEPHROPATHY. ***Stephanie Wall*****, Dept. of Chemistry, Univ. of Ala. at Birmingham. Stacy Hall, Bruce Julian, and Jan Novak, Dept. of Microbiology, Univ. of Ala. at Birmingham. Michelle Gomes and Andrew Herr, Dept. Molecular Genetics, Biochemistry & Microbiology, Univ. Cincinnati College of Medicine. Matthew Renfrow, Biochemistry and Molecular Genetics Department, University of Alabama at Birmingham. Birmingham, AL 35294.**

IgA Nephropathy (IgAN) is a disease in which circulating immune complexes (CICs) with high amounts of Immunoglobulin A (IgA) become deposited in the kidney. IgA,of the isoform IgA1, is normally glycosylated by up to six O-glycans and two N-glycans. The O-glycans are attached to serine and threonine residues within the hinge region, located between the first and second constant domains on the heavy chain of IgA. One of the two N-glycans is found attached within the second constant domain of the heavy chain. The other N-glycan is found attached to a tailpiece segment after the third constant domain of the heavy chain of IgA. The disease pathology of IgAN is thought to be due to abnormal glycosylation of IgA1. High resolution mass spectrometry was used to identify the various glycoforms IgA1 within a single serum sample. The focus of this project is to develop analytical techniques to identify differences within the IgA1 glycosylation patterns of IgA1 from IgAN patients and IgA1 from normal healthy controls.

Greenfly Orchid (Epidendrum magnoliae Muhl., Orchidaceae) in Alabama. ***Alvin Diamond*****, Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.**

Epidendrum magnoliae is the most northerly distributed epiphytic orchid in the Western Hemisphere, occurring from North Carolina south and west to Louisiana and in north eastern Mexico. It is the only epiphytic orchid native to Alabama. The herbaria of Auburn University (AUA), the University of Alabama (UNA), the University of South Alabama (USAM), the University of West Alabama, Jacksonville State University (JSU), the Anniston Museum of Natural History, and Troy University (TROY) were searched for collection records of this species. This historical data along with field observations were used to determine the distribution of the species within Alabama, the specie's preferred habitat, host tree specificity, and dates of flowering and fruiting.

HERPETOLOGY AT JACKSONVILLE STATE UNIVERSITY. ***George Cline*****, James Rayburn, and Chris Murdock. Biology Dept., Jacksonville State University, Jacksonville, AL 36265-1602.**

Herpetology research in Alabama has historically been driven by research at larger, Ph. D. granting institutions. Three faculty at Jacksonville State University now represent a core of researchers with complementary research methods that have herpetology interests. Dr. George Cline is a field herpetologist whose research topics include frog communication, herpetological community structure, herptile conservation biology, and amphibian and reptile natural histories. He is particularly interested in temporal and acoustical partitioning in frog communities. Dr. James Rayburn is an ecotoxicologist who's research interests lie in amphibian development and amphibian metamorphisis. He uses Frog Embryo Teratogenesis Assay- Xenopus (FETAX) as one of his research techniques to study the effects of chemicals and other environmental factors on amphibians, and biomarkers to study vitellogenin induction by anthropogenic estrogens. Research topics currently being addressed in Dr. Chris Murdock's laboratory include regulatory mechanisms within the hypothalamus-pituitary-gonad axis of snakes, along with possible temperature effects on sex determination in amphibians. In these studies herpetology is addressed from a molecular biology/biotechnology perspective in order to address the underlying physiological and development cascades in the reproductive axis of these organisms. Specific techniques currently being utilized include: PCR, gene cloning, quantitative real-time PCR, and gene sequencing. The complementary approach to herp research at JSU represents a synergistic collaboration among individuals with diverse skills. This unique combination of faculty and skills offers exciting new ways to approach herpetological research

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In Vitro Three Body Wear of 5 Composite Resins.*AYESHA SWARN*, D. CAKIR, L.C. RAMP, D. DEAN and J.O.BURGESS.Department of Material Science and Engineering , Department of Prosthodontics. University of Alabama at Birmingham, Birmingham, AL 35294.

Composite resins are being increasingly used as posterior restorative materials and their long term success depends upon their ability to resist wear under masticatory loads. Objective: To compare the in-vitro wear of 5 commercially available composite resins. Materials and Methods: Six mm thick flat composite specimens (n=8) were prepared and polymerized with a curing light (560mW/cm2 Ivoclar VIVADENT Inc.) in 2mm intervals following the manufacturer's instructions. Specimens were stored at 37°C, for 24 hours. After storage, specimens were mounted in brass holders and loaded into an Alabama Wear Testing Device for 400,000 cycles at 1.2Hz applying a 75N force. The test was performed with a stainless steel antagonist. A slurry of 50um PMMA beads (15g PMMA/ 9 g water) was used as a third body medium. The volumetric loss through wear of the specimens was determined using a 3D non-contact profilometer (Proscan 2000, Scantron Industrial Products Ltd.Taunton, England). A one-way ANOVA and Tukey's post-hoc test were used for data analysis. Results:The materials and corresponding wear volume in cubic mm were:EsthetX(0.067±0.024); Filtek Supremeplus 0.045±0.02); Miris2(0.076±0.029); Premise(0.035±0.008);Venus (0.049±0.019) There are significant differences in between the in-vitro localized wear volume of Miris2 and Premise only. Conclusions: All materials tested showed wear in varying degrees. The materials with higher wear resistance are more favorable for posterior restorations. Supported in part by a grant from Coltene Whaledent.

INCUBATION TEMPERATURE EVALUATION FOR TURTLES WITH TEMPERATURE-DEPENDENT SEX DETERMINATION. ***Corie L. Therrien*** **and Thane Wibbels, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.**

A variety of reptiles, including all sea turtles, have temperature-dependent sex determination (TSD), where incubation temperature determines gender. This form of sex determination has significant conservational implications since it has the potential of producing highly biased sex ratios which can affect the reproductive output of a population. TSD is of particular interest to conservation programs that use hatcheries to artificially incubate eggs. Such programs need to select specific incubation temperatures in an effort to produce a desired sex ratio. The purpose of this study was to evaluate optimal temperatures for incubating eggs in hatchery programs. For example, if a 1:1 sex ratio is desired, is it better to incubate all the eggs at the pivotal temperature (where half the hatchlings will be male and half female) or is it better to incubate half the eggs at an all male-producing temperature and half at an all female-producing temperature? To address this question, the red eared slider turtle was used as a model since its TSD is similar to that of sea turtles. The reproductive tracts were compared between late-stage embryos incubated at temperatures that produced either all females, mostly females, mostly males, or all males. The gross morphology and histology of the reproductive tracts of these four groups were compared. The results indicate significant variation between the groups. This suggests that certain incubation temperatures may be optimal for producing the most reproductively-fit individuals.

ISOLATION AND CHARACTERIZATION OF SCARECROW SUPPRESSOR MUTANTS IN ARABIDOPSIS THALIANA. ***Vijaya K. Mekala*** **and Joanna Wysocka-Diller, Dept. of Biological Sciences, College of Science and Mathematics, Auburn University, Auburn, AL-36849.**

SCARECROW (SCR) is a transcriptional regulator that plays key roles in several developmental processes in a model plant Arabidopsis thaliana. SCR orthologs have been identified in agriculturally important plants such as rice and corn. It has also been demonstrated that at least some of the SCR functions have been conserved throughout plant kingdom. In Arabidopsis, among its many functions SCR is essential the maintenance of root meristem, the development of root and shoot endodermis and for normal shoot gravitropism. As a result, scr mutants exhibit many phenotypic defects relating to these functions such as, short roots, short hypocotyls, small leaves, shoot agravitropism as well as cell layer deletions in both roots and shoots. We have initiated a genetic screen to identify mutants that suppress scr mutant phenotype(s). In this scr suppressor screen we aim to identify and characterize other components of SCR-regulated pathways. Seeds homozygous for scr1 were mutagenized with EMS, germinated and grown to maturity. Seeds were collected in pools from approximately100 plants in each pool. All the seeds from the first 29 pools, representing close to 3000 independent lines were screened for suppressor phenotypes. Over 200 potential suppressors were isolated. The majority of the putative suppressors had either longer roots or showed some degree of hypocotyls gravitropism. The potential suppressors were grown to maturity and seeds were collected from all the surviving and fertile plants. We collected seeds from 130 of the primary isolates. All of them were retested for suppressor phenotype and those that still had longer roots or gravitropic hypocotyls were tested for the presence of scr1 allele. Six of the primary isolates have been confirmed as potential scr suppressors. Five of these mutants displays hypocotyl gravitropism and only one has a significantly increased root length. The suppressor with the long roots, 24R1, was selected for mapping analysis. 24R1 plants were crossed to scr3, which is in a different genetic background. One quarter of the progeny from the cross has long roots indicating that the suppressor is not allele specific. DNAs isolated from individual plants with long root phenotype were used for mapping using molecular markers. Two to three CAPS markers were used for each of the five Arabidopsis chromosomes. The only linkage was shown for chromosome 4. The mutation responsible for the suppressor phenotype in 24R1 maps to long arm of chromosome 4 about 17.3 cM away from the closest CAPS marker available.

Malaria vaccine development: Genotyping *Plasmodium falciparum* Merozoite Surface Protein 6 in the *Peruvian Amazon. Aaron T. Neal*, Stephen J. Jordan, OraLee H. Branch, Julian C. Rayner, University of Alabama at Birmingham, Birmingham, AL 35294.

Malaria is responsible for 1-3 million deaths annually, mostly in children under age five. With drug resistance on the rise, a vaccine seems to be the best solution to combat the most lethal form of the disease, *Plasmodium falciparum*. This study focuses on *P. falciparum* Merozoite Surface Protein 6 (PfMSP6), a promising vaccine candidate present on the surface of the P. falciparum parasite. Utilizing samples from P. falciparum infected patients in the Peruvian Amazon, PfMSP6 genotypes were tracked over four consecutive transmission seasons. The longitudinal nature of the study enabled us to compare PfMSP6 genotype frequencies between transmission seasons, villages, and consecutive infections in single individuals. The results of the study will establish the predominance of PfMSP6 genotypes and indicate any immune-related selection pressures; important factors when selecting genotypes to target in a vaccine. The data generated will provide important information to advance a PfMSP6-based malaria vaccine.

Manipulation of the Centaurin Alpha-1 gene in neurons via a Lentiviral Vector. Donna Hill, Dr. Anne Theibert, Dr. Mary Ballestas, Carlene Moore, Jennifer Larrimore, Christopher Chapleau, Sarah Worth,Sharday Ewell, Ireland Scholars Program University of Alabama at Birmingham, Department of Biology and Neurobiology., Birmingham, AL 35294.

Viruses have become an effective and common tool of many cellular and molecular biologists. One of their primary roles in cellular and molecular biology is that of transporting genetic material. Although viruses are useful because they have relatively high transfection efficiency, most are limited by their ability to only tranfect dividing cells. Unfortunately this excludes much brain research and many neurobiologists have not been able to exploit the ability of viruses to transport genetic material. However, lentiviruses are potentially good vectors for transporting genetic material into neurons because they can infect dividing and non-dividing cells. In this study we examine the ability of a lentiviral vector to deliver the centaurin alpha-1 gene. This gene has been implicated as an autism susceptibility gene. Its product, centaurin alpha-1, is a known to bind to PtdIns (3,4,5) P3-binding protein with high affinity in the brain. It has been implicated in cystoskeletal construction, maintenance and remodeling. Its ability to affect the cytoskeleton allows for effective immunoflourescent examination of morphological changes due to an increase in protein expression. The presence of lentiviruses was detected using GFP. Finally, increased production of centaurin alpha-1 protein was detected using Western Blot analysis.

MARINE FUNGI ON SEAGRASS BEDS IN TWO FLORIDA LAGOONS. ***Linda A. Collier*****, Dept. of Marine Sciences Univ. of South Alabama, Mobile, AL 36688 and Dauphin Island Sea Lab, Dauphin Island, AL 36528. Juan L. Mata, Dept. of Biology, University of South Alabama, Mobile AL 36688. Just Cebrian, Dauphin Island Sealab, Dauphin Island AL, 36528 and Dept. of Marine Sciences, University of South Alabama, Mobile AL 36688.**

Coastal plant and animal communities have been extensively studied for many years, but their mycological component has been largely neglected or poorly studied until recently. The discipline of marine mycology received only sporadic interest from researchers until the late 1940's. Since then, a total of 444 species have been described worldwide, distributed mostly in the higher groups of ascomycetes and basidiomycetes. A small number of these taxa have been documented for the Gulf Coast of the United States. Because only a few sites have been considered locally, it is unclear how much variation there is in fungal presence between sites. Furthermore, the ecological importance of marine fungi as decomposers of plant detritus is poorly understood compared to that of terrestrial and aquatic environments. Species composition data from more sites is needed as well as studies aimed at examining the ecological importance of marine fungi. The data presented here are from preliminary surveys from two seagrass beds in the North-Central Gulf Coast. One seagrass bed is approximately pristine while the other is highly impacted from wastewater and runoff from nearby homes and a roadway. So far, four species of ascomycetes have been recovered directly from plant material from the pristine site. These results are part of an ongoing graduate research project that aims to document the diversity and abundance of marine fungi associated with seagrass beds.

PANCREATIC STUDIES USING DIFFERENT MODELS EXAMINING REGULATION OF SECRETORY AND METABOLIC FUNCTION. ***Kimberly A. Hobbs*****, Debra L. Byrd, Emanuel Waddell, Jeriel L. Johnson, Adriel D. Johnson, Sr., Department of Biological Sciences, University of Alabama in Huntsville, Huntsville, AL, 35899. Jacqueline U. Johnson, Department of Food and Animal Science, Alabama A&M University, Normal, AL 35762.**

In vitro culture techniques have been utilized as model systems to examine regulatory mechanisms of pancreatic secretions and metabolism in different animals. Studies in our laboratory have involved an avian pancreatic whole organ culture system used to investigate the role of muscarinic receptors regulating exocrine secretions (Autonomic Neuroscience: Basic & Clinical 105 (2003)118-130). Recent studies using the embryonic organ culture system measured amylase release during incubation periods of 30 minutes – 12 hours revealing loss of viability and morphological degeneration after 12 hours of incubation. Use of selective cholinergic antagonist has revealed that the majority of the receptor population present is functionally similar to the mammalian pancreas muscarinic subtype M3. Studies are being developed which will investigate rodent pancreatic islet cell free radical formation induced by alloxan monohydrate. In addition, we are examining the effects of prophylactic and therapeutic natural products with antioxidant characteristics that will serve as a model for the syndrome similar to type I and type II diabetes mellitus. Isolation of pancreatic cells from Sprague Dawley rats involved 1 mg/ml Type IV collagenase through ductal injection in order to digest tissue into a dispersion and then cultured in an atmosphere of 5% CO2 at 37°C. Pancreatic diabetogenic cells will be examined using SEM techniques. Receptor populations will be examined using the RDAbs® Muscarinic M3 Receptor IFA kit for indirect immunofluorescence. Studying the contribution of muscarinic receptors in their regulatory role in endocrine and exocrine pancreatic function using cell cultures for alloxan induced experimental animals can be important in understanding the diabetic state.

POTENTIAL EFFECTS OF CLIMATE CHANGE ON ALABAMA'S PLANT LIFE.

***L. J. Davenport*, Dept. of Biol. & Environmental Sciences and Vulcan Materials Center for Environmental Stewardship & Education, Samford University, Birmingham, AL 35229.**

Alabama's native plant life, agricultural crops, forests, and invasive species were examined in light of models of future climate change. In general, tropical species will be enhanced under warmer-wetter conditions, while temperate species will be severely constricted or lost entirely. Mediterranean or arid-based species will flourish under hotter-drier conditions. With climate change, some of Alabama's current ecoregions will shift northward or northeastward; others, based on specific geological formations, will be greatly constricted or disappear. Alabama's future ecoregions will most likely present new associations of plant species, and the state's threatened and endangered plant species will decline further with predicted habitat losses. Temperate-based crops (such as wheat and peaches) will most likely be lost to the state's agriculture with climate change; tropical-based crops (such as tomatoes, melons and citrus) will be enhanced, but only if enough water is available. Under hotter-drier conditions, crop plants will suffer more frequent droughts and forests will experience more frequent fires. In addition to species migrations and losses, Alabama's forests will suffer increased pest problems and increased populations of vines. Alabama's future pest and invasive plant species will be more tropical-based.

Presence of diosgenin in Smilax (Smilacaceae). *J. A. Beard*, E. G. Dobbins and L. J. Davenport. Department of Biological and Environmental Sciences, Samford University, Birmingham, AL 35229.

Diosgenin, a steroid sapogenin of the saponin dioscin, can undergo oxidation to produce a progesterone-like structure that has been used to synthesize human sex hormones and to treat conditions that are regulated by these hormones. Diosgenin has been shown to be present in many species of Dioscorea (Dioscoreaceae), which includes wild and domesticated yams. Smilax, a very closely related genus in a different family (Smilacaceae), has been shown to contain diosgenin in two species, S. china and S. menispermoidea, but no evidence exists of diosgenin in other Smilax species. This subject is of interest because, due to recent molecular studies, the Smilacaceae and Dioscoreaceae have been placed in different orders (Liliales and Dioscoreales, respectively). By investigating the diosgenin content of two Smilax species, S. bona-nox and S. glauca, insight can be obtained on the chemical similarities and differences of the Smilacaceae and Dioscoreaceae. To investigate the presence of diosgenin in these species, methanol extraction was performed and this extract was further purified through solid phase extraction. The products were then analyzed using mass spectroscopy to verify presence of diosgenin. Our analysis showed that diosgenin was present in both species of Smilax when compared to mass spectroscopy data for a diosgenin standard. Despite the molecular data, this work demonstrate the existence of a chemical basis for a close relationship between Smilacaceae and Dioscoreaceae.

PROGESTERONE IN GYMNOSPERMS. *John D. Carson*, Dept. of Biology, Samford University, Birmingham, AL 35229. Elizabeth Dobbins Dept. of Biology, Samford University, Birmingham, AL 35229.

Progesterone in Gymnosperms John D. Carson, Elizabeth Dobbins Samford University, Birmingham, Al 35229 The loblolly pine tree (Pinus taeda), used for both pulp and lumber, is the most common source of timber in the southeastern United States. Progesterone was recently described in homogenized extracts from P. taeda (Carson et al., 2008). Progesterone in pulp mill effluent has demonstrably negative effects on the environment, including masculinizing mosquitofish (Gambusia affinis). The current study sought to identify progesterone in wood from other timber species. Eastern white pine (Pinus strobus) and short leaf pine (Pinus echinata) are two other commercially valuable southeastern timber species. While P. echinata and P. taeda are from the same Subgenus (Pinus), P. strobus is from the Subgenus Strobus. It was expected that, like P. taeda, P. echinata would be likely to contain progesterone, while P. strobes would be less likely. As a control, the more phylogenitically divergent Bald Cyress (Taxodium distichum) of the Family Taxodiaceae was also tested. Homogenized samples of the four woods were methanol extracted, cleaned by filtering and solid phase extraction, and analyzed by liquid chromatography-mass spectroscopy. Contrary to expectations, only P. taeda contained measurable levels of progesterone. Since the P. taeda was collected in Louisiana and the others in Alabama, it is possible that there are regional effects on progesterone concentration in trees. Alternately, there may be a specific physiological purpose for progesterone in P. taeda as yet not understood.

SEX RATIOS AFFECTED BY DAILY WATER TREATMENTS IN A TURTLE WITH TEMPERATURE-DEPENDENT SEX DETERMINATION. ***Anne Marie LeBlanc*** **and Thane Wibbels, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.**

A variety of reptiles have temperature-dependent sex determination (TSD) in which the temperatures experienced during incubation appear to be the main factor affecting sex determination. Previous reports have suggested that sex determination in species with TSD may also be influenced by the hydric environment given certain laboratory conditions. However, other reports suggest that this relationship remains uncertain and currently, it is generally accepted that that the hydric environment has no role in sex determination. Recently, this question has resurfaced since sex ratios produced from sea turtle nests on natural nesting beaches do not always match the sex ratios predicted from laboratory studies using constant incubation temperatures. This suggests that other factors may be influencing sex determination. In order to examine the hydric environment's effects on TSD, the current study applied water treatments to eggs of the red-eared slider turtle. Eggs were incubated at a temperature (29.1 degrees Celcius) which produced predominantly females. Eggs were divided between control and experimental groups. The experimental groups received a daily water treatment (0.77 ml ddH2O per egg per day administered externally) during the temperature sensitive period. The control groups produced approximately 90% females ($n = 53$). The experimental groups ($n = 84$) produced significantly more males than the control groups ($P < 0.05$). The results suggest that water treatments, applied daily directly to the egg, can influence TSD. This could have implications when examining sex ratios from natural nesting beaches that are periodically exposed to rain and have the potential to alter management strategies.

Shear Bond Strength of Three Adhesives to Enamel and Dentin. ***P. JAMPANI*****, D. CAKIR, J. BURGESS, and L. RAMP, University of Alabama at Birmingham, Birmingham, AL 35294.**

Bonding agents have evolved from total etch to two bottle and finally one bottle self etching systems. These newly developed systems may not bond as well to enamel or dentin as total etch materials. OBJECTIVES: To measure and compare the shear bond strength of three adhesives to enamel and dentin. METHODS: 60 extracted, intact, human molars were divided into two groups and wet ground with 600 grit to obtain flat enamel (E) and dentin (D) surfaces. The materials used were Adper Scotchbond SE (3M ESPE) a two component self etching adhesive, Adper Easy Bond (3M ESPE) a single component self etching adhesive and Adper Single Bond Plus (3M ESPE) a total etch one bottle adhesive. The adhesives were applied. A plastic tube (diameter~1.5mm) filled with composite-resin (Z100) was placed over the adhesive and cured for 40 seconds with a curing light (Fusion, output >800 Mw/cm2). Samples (n=10) were stored in water for 24 hours at 37°C in an incubator. Specimens were placed in a special fixture mounted on a Universal testing machine (INSTRON, model number 5565) and loaded to failure at a crosshead speed of 1mm/min. The failure load was converted to bond strength by dividing by the bonding area.

The data were analyzed with 2-factor ANOVA ($p=0.05$). RESULTS: (n=10) (Mean±SD). Adper Scotchbond SE Adper Easy Bond Single Bond Plus E 18.9±6 19.2±5 22.6±7 D 23±5 25.7±5 26.1±6 CONCLUSIONS: No significant difference was shown between the substrate or the bonding agent ($p>.05$). Early in vitro results show that the self etching adhesives show promise as effective bonding agents.

SHEAR BOND STRENGTH OF THREE ADHESIVES TO ENAMEL,GROUND-ENAMEL AND DENTIN.*P. KADAM*, R.S. ZADEH, D. CAKIR, J. BURGESS, and L. RAMP, University of Alabama at Birmingham, AL 35294.

Bonding agents continue to develop with basic changes from a total etch to self etching systems. However the self etching systems have a higher pH which decreases the bond to enamel. OBJECTIVES To measure and compare the shear bond strength of two experimental self-etch adhesives with a commercially available self-etching adhesive on enamel, ground-enamel and dentin. METHODS 90 extracted human molars were divided into 3 groups, 30 each. For the enamel group flattest surface was used. For the two other groups, the teeth were ground with a 600-grit wet SiC abrasive wheel to obtain flat enamel and dentin bonding surfaces. The adhesives used were Clearfil SE (Kuraray), SCB Experimental O-(Coltene Whaledent), SCB experimental P-(Coltene Whaledent). The adhesives were applied according to manufacturer's instructions. A plastic tube filled with composite-resin (Synergy/Coltene Whaledent) was placed over the adhesive and polymerized for 40s with Coltolux LED curing light (750 Mw/cm2). Samples were stored in water for 24 hours at 37°C in an incubator before testing. Specimens (n=10) were loaded until failure at a crosshead speed of 1mm/min on a Universal testing machine (INSTRON, 5565). The data were analyzed with 2-factor ANOVA and Tukey/Kramer post-hoc tests ($p=0.05$). RESULTS: Mean±SD in MPa UNGROUND ENAMEL GROUND ENAMEL DENTIN Clearfil SE 26.8±4 31.6±4 28.7±2 SCB Experimental O 19.7±4 23.6±5 24.9±3 SCB experimental P 17.9±4 20.8±2 21.7±3 CONCLUSIONS Based on the results of this study, Clearfil SE showed higher shear bond strength for all three substrates ($p<0.05$). Significant differences were found between dentin, ground enamel and enamel.

SHEAR BOND STRNGTH OF SELF ADHESIVE CEMENTS.*T. GHUMAN*, R.S. ZADEH, D. CAKIR, J. BURGESS, L.C. RAMP, and P. BECK, University of Alabama at Birmingham, AL 35294.

Self adhesive cements are becoming popular due to the reduced number of steps required for cementation. New self adhesive cements continue to develop and improve but further testing is required. OBJECTIVE: To measure shear bond strength to zirconia disks of seven commercially available and a new adhesive cements. METHODS: The surfaces of 80 Cercon discs were wet ground with 320-grit SiC abrasive paper for 1min, followed by air-abrasion with 25mm AL203. They were randomly assigned to eight groups (n=10). Light-cured composite rods of Z100 (d~2.35mm) were prepared and abraded with 25mm

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AL203 for 2s, followed by application of Clearfil SE bonding agent (light-cured for 20s). Rods were cemented to Zirconia using self-adhesive cements (G-Cem[G], RelyX Unicem Aplicap[UA], RelyX Unicem Clicker[UC], Biscem[B], Multilink Sprint [MS], Maxcem[M], Experimental Cement [K], Panavia F2.0 [P]) following manufacturer's instruction with constant weight of 400g and cured for 20s with Coltolux light (750 Mw/cm2). Samples were incubated at 37C for 24h, thermocycled between 6-600C with a 15s dwell time for 1000 cycles. They were debonded using a universal testing machine (Instron 5565) with crosshead speed of 1mm/min. The results were analyzed with ANOVA followed by Tukey/Kramer ($p=0.05$). Samples were evaluated under SEM. RESULTS: Mean± SD in MPa. G UA UC B MS M K P 11.4±1 14±4 12.4±4 8.3±2 8.6±2 5.8±11 4.8±5 10.5±2 Tukey/Kramer post hoc test showed no significant difference ($p>0.05$) between experimental cement (K) and G-Cem, Panavia F 2.0, Unicem cements. CONCLUSION: Self adhesive cements continue to develop but further improvement should be continued

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TEMPERATURE DEPENDENT VITELLOGENIN MRNA PRODUCTION IN THE MALE WESTERN MOSQUITOFISH, GAMBUSIA AFFINIS. Paul D. Melvin*, III, Dept. of Natural Sciences, Clayton State Univ., Morrow, GA 30260 and Robert Angus, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.

Many anthropogenic compounds with estrogenic activity have been detected in aquatic environments. Vitellogenin (VTG), an egg yolk protein produced by the liver in oviparous female vertebrates in response to estrogen, is not normally detectable in the serum of males. Various studies have indicated that environmental estrogens can induce VTG protein and mRNA in males of a variety of aquatic vertebrate species, including the western mosquitofish, Gambusia affinis. If the presence of VTG mRNA in males is to serve as a reliable estrogen biomarker, it is important to understand other factors that influence its production. Although the regulation of vitellogenesis is poorly understood, previous observations in our lab have suggested that temperature plays an important role. We hypothesize that estrogenic induction of VTG mRNA in males will decrease as water temperature decreases. In this study, male G. affinis -ethinylestradiol via diet at a concentration of (5 μg/g ofαwere exposed to 17 food) for a period of one week. This concentration was previously shown to strongly induce VTG production in one week at 24 °C. During exposure, the fish were kept at a constant waC. VTG°ter temperature of 16, 20, or 24 (± 1 °) induction at the mRNA level was examined by RT-PCR. It was shown there was significant downregulation of VTG mRNA induction at lower temperatures. These results demonstrate that temperature strongly affects the extent to which Gambusia affinis produces VTG mRNA in response to estrogen exposure. This work was supported in part by the Alabama Academy of Science.

The Fishes of Oak Mountain State Park ***David M. Frings*****, Dr. Robert Stiles, and Dr. Jason Heaton Samford University. Birmingham, AL 35229.**

Oak Mountain State Park is located in the central portion of Shelby County, Alabama in a highly urbanized area of the state. The parks drainage system is included in the Cahaba River basin which has four primary tributaries that transect the park; Dry Brook, Hogpen Creek, Cahaba Valley Creek, and Peavine Branch. The purpose of this study is to collect data on the fish that occur in the park and compile a photographic record of each species. The study is a portion of a larger study by Samford University to document all of the fauna in Oak Mountain State Park so that there will be a baseline of data for future conservation efforts and planning. During this phase of the fish study, sampling was conducted in Dry Brook and Hogpen Creek. The second phase of the fish study will continue sampling in these tributaries and expand the sampling to Cahaba Valley Creek and Peavine Branch. Thirteen species of fish were collection during 2007 and the first quarter of 2008 that represent six families.

TORUS-BEARING PIT MEMBRANES IN THE WOOD OF PICCONIA (OLEACEAE). Kyle Paris, Charles Holloway, ***Roland Dute*****, Auburn University, Auburn, AL 36849. Steven Jansen, Jodrell Laboratory, Royal Botanic Gardens, Kew, UK.**

Torus-bearing pit membranes that connect water-conducting cells are common in the wood of conifers and Ginkgo, but uncommon in flowering plants. Osmanthus (Oleaceae) is one of the few genera of the latter known to have pit membranes with tori. Recent molecular studies indicate a close relationship between Osmanthus and the genera Nestegis, Phillyrea, Notelaea, and Picconia. Investigations in our laboratory show the first three genera to lack tori. Only the two species of Picconia, P. excelsa and P. azorica, possess these structures. In P. excelsa, tori are common; in P. azorica they are rare and difficult to locate. Torus-bearing pit membranes in P. excelsa exist in both early and late wood. The torus on a pit membrane is circular, centrally located, and has a diameter greater than that of its adjacent pit aperture. Further studies are needed to clarify whether the torus represents a shared, primitive structure in this portion of the Olive Family, or whether it has evolved multiple times.

USING BACKBONE AMIDE H/D EXCHANGE MASS SPECTROMETRY TO STUDY PROTEIN STRUCTURE AND DYNAMICS. ***Laura S. Busenlehner*****, Department of Chemistry, The University of Alabama, Tuscaloosa, AL 35487.**

The backbone of a protein contains a unique set of tandem chemical reporters, the amide NH group. Amide hydrogen/deuterium exchange mass spectrometry (H/D exchange MS) is emerging as an attractive technique that has been used for over three decades to investigate protein structure and dynamics. H/D exchange MS has certain advantages in that there is no practical size limitation to the protein, the working protein concentrations can be in the sub-micromolar range, and the technique can be easily extended to membrane proteins. Spatial resolution is typically achieved by proteolysis and mass analysis of the peptide fragments. Amide hydrogen/deuterium exchange kinetics can vary dramatically within a protein due to hydrogen bonding, solvent accessibility, and backbone flexibility. Therefore, the amide exchange rate is highly dependent on protein structure, as well as dynamics. The theory and experimental design of a typical H/D exchange MS experiment will be presented, along with several examples of applications of the technique. In particular, the advancement into membrane protein structure and protein-ligand interactions will be highlighted.

Herpetology at Jacksonville State University. ***George Cline*, James Rayburn, and Chris Murdock. Biology Department, Jacksonville State University, 700 Pelham Road North, JAcksonville, AL 36265-1602**

Herpetology research in Alabama has historically been driven by research at larger, Ph. D. granting institutions. Three faculty at Jacksonville State University now represent a core of researchers with complementary research methods that have herpetology interests. Dr. George Cline is a field herpetologist whose research topics include frog communication, herpetological community structure, herptile conservation biology, and amphibian and reptile natural histories. He is particularly interested in temporal and acoustical partitioning in frog communities. Dr. James Rayburn is an ecotoxicologist who's research interests lie in amphibian development and amphibian metamorphisis. He uses Frog Embryo Teratogenesis Assay- Xenopus (FETAX) as one of his research techniques to study the effects of chemicals and other environmental factors on amphibians, and biomarkers to study vitellogenin induction by anthropogenic estrogens. Research topics currently being addressed in Dr. Chris Murdock's laboratory include regulatory mechanisms within the hypothalamus-pituitary-gonad axis of snakes, along with possible temperature effects on sex determination in amphibians. In these studies herpetology is addressed from a molecular biology/biotechnology perspective in order to address the underlying physiological and development cascades in the reproductive axis of these organisms. Specific techniques currently being utilized include: PCR, gene cloning, quantitative real-time PCR, and gene sequencing. The complementary approach to herp research at JSU represents a synergistic collaboration among individuals with diverse skills. This unique combination of faculty and skills offers exciting new ways to approach herpetological research.

Chemistry Paper Abstracts

Binding of All-trans Retenoic Acid to Retinoic Acid Receptor. Alexander E. Vaughn, Tracy P. Hamilton, Department of Chemistry, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.

Members of the retinoid family interact with nuclear receptors(NR). NRs, which are regulated by small molecule signals, regulate transcription. All-trans retinoic acid (RA) and 9-cis-retinoic acid (9cRA) are activators of Retinoic Acid Receptors (RARs). UAB-30, an analog of 9cRA, is a drug targeted to prevent prevent cancer by targeting human RXR-gamma. This study will investigate the binding of RA to the human RAR ligand binding domain(RAR-LBD). The x-ray diffraction structure for the ligand binding domain of human RAR-gamma bound to RA was downloaded from the PDB data bank(Renaud, J.-P.; Rochel, N. R. Nature 1995, 378, 681-689). Waters were removed from this experimental structure and 25 RA molecules were added at random positions. The system was then minimized via molecular dynamics for 7.5ps (all molecular dynamics runs had a timestep of 1fs). This structure was then solvated using a water box padded with 1.5nm of water molecules, and again minimized for 10ps. Afterwards the protein was brought to a temperature of 310K from 0K by 5K increments every picosecond. This work was made possible in part by a grant of high performance computing resources from the Department of Computer and Information Sciences at the University of Alabama at Birmingham, the School of Natural Sciences and Mathematics at the University of Alabama at Birmingham, and the National Science Foundation Award CNS-0420614.

BUFFERING CAPACITIES OF SOME COMMON FOODS. ***Stantafferta McPhee,*** **Keri Reeves, and Brian Burnes, Department. of Biology, Judson College, Marion, AL 36756.**

Common foods from a simple grocery list can be used as an alternate to commercially available antacids. Mashed potatoes, cream cheese, tomatoes, and jalapeno peppers, and sweet tea, orange juice, Gatorade, Coca-Cola, and milk, were compared for their pH buffering capacities by titration. Each food (10g) was mixed with water (20mL) to create a solution. Each solution was acidified and then titrated with 1M sodium hydroxide to slowly increase the pH from two to eleven. The pH was monitored and recorded, along with volume of base added, to create a titration curve for each substance. Foods with the strongest buffering capacities displayed a curve with a steady slope followed by a plateau and another slope. For both foods and beverages, dairy products required the most sodium hydroxide (8.7mL for cream cheese and 6.1mL for milk), in contrast to Coca-Cola or jalapenos (approximately 2.5mL for both). In conclusion, dairy products displayed the most buffering capacity and may be a good alternative to commercial antacids.

C-Terminal Endgroup Effects on Fragmentation of Peptides by Mass Spectrometry. *Samantha S. Bokatzian-Johnson* and Carolyn J. Cassady, Department of Chemistry, University of Alabama, Tuscaloosa, AL 35487.

Mass spectrometry has become an indispensable tool for the sequencing of peptides. The predictable fragmentation patterns gave way to nomenclature that is recognizable throughout the discipline. A peptide is a short polymeric compound based on a-amino acids connected by peptide bonds. The general structure has an amine group on one end (N-terminus) and a carboxylic acid group on the other end (C-terminus). If the C-terminus carboxylic acid group, (C=O)OH, is replaced with an amide group, (C=O)NH_2, the mass spectral fragmentation pattern of the peptide changes slightly.

Using peptides commercially available as both acid and amide forms at the C-terminus, fragmentation studies have been conducted using collision-induced dissociation (CID) and electron transfer dissociation (ETD) mass spectrometry methods with electrospray ionization/quadrupole ion trap (ESI/QIT). The results show that the differences between the fragmentation patterns of the analogs can be traced to a few characteristic peaks. The mechanisms responsible for the formation of these particular peaks can provide valuable insight to the effect of end groups on peptide fragmentation.

FABRICATION OF MICROFLUIDIC DEVICES UTILIZING CONSUMER PRODUCTS. *Emanuel A. Waddell*, Jeriel Johnson, Emily Haanschoten, and Arik Schwartz, University of Alabama in Huntsville, Huntsville, AL 35899.

The use of microfluidic devices has greatly increased over the past several years. Historically, the majority of microfluidic devices have been fabricated in silica substrates because of their well-understood silane-based chemistry, desirable optical properties, and easily transferable techniques from capillary electrophoresis in glass capillaries. Recently, there has been increased interest in utilizing polymer substrates as the basis for microfluidic devices. Advantages over silica devices include low cost, reduced weight, and ability to withstand shock. In addition, a number of methods for the rapid and low-cost fabrication of polymer based microfluidic devices have been published. Briefly, fabrication has been demonstrated by wire imprinting, hot-embossing, laser ablation, laser transparency methods, and x-ray lithography. An ideal rapid, inexpensive, and simple microfabrication process must meet several criteria. These criteria include (1) the ability to apply the fabrication process to different polymers without a modification in the fabrication process, (2) the ability to perform the fabrication in a desk-top setting; i.e., in environments where access to laboratory safety apparatus is limited, (3) the ability to fabricate multiple devices from a single mode, and (4) reduce total cost to dollars per device (on a manufacturing scale of tens of devices). The methods described here are based upon the use of off-the-shelf consumer products which are low cost and environmentally friendly. The research presented will provide a brief overview of several techniques.

Mass Spectrometry Investigations of Chromium(III) Complexed with Acidic Peptides ***Heather Watson* and Carolyn J. Cassady, The University of Alabama, Tuscaloosa, AL 35487.**

A chromium bound peptide has been reported to be involved in removing excess chromium from the body and in insulin signaling. Little is known about the structure of this chromium(III) bound peptide. Matrix assisted laser desorption ionization time of flight mass spectrometry (MALDI/TOF MS) and electrospray ionization quadruple ion trap mass spectrometry (ESI/QIT MS) were used to study complexes formed between chromium(III) and synthetic acidic peptides. Similar spectra were obtained by using post source decay (PSD) in MALDI/TOF and by collision induced dissociation (CID) in ESI/QIT/MS. Differences in peptide fragmentation are seen when comparing the spectra of samples with and without the addition of chromium. Chromium drastically reduces the extent of fragmentation in peptides making their sequences difficult to establish by tandem mass spectrometry. Funding provided by NIH.

NOVEL AND ROBUST PHOTOLABILE PROTECTING GROUP TOOLBOX FOR CARBONYL COMPOUNDS. *Yun Wang, Huayou Hu and Pengfei Wang, Dept. of Chemistry, Univ. of Ala. at Birmingham, Birmingham, AL 35294.

Photolabile protecting groups (PPGs) are very useful tools in organic synthesis, biochemistry, and biomedical applications. However, practically useful PPGs for some important functional groups such as the carbonyls are still rare. Herein, we report our effort in developing a toolbox of novel and robust PPGs for carbonyl compounds. These PPGs are structurally simple and can be readily synthesized from commercially available and inexpensive materials. The installation of the PPGs upon carbonyl compounds were achieved in excellent yields. Carbonyl compounds in their protected forms have excellent dark stability and can be photochemically released in high efficiency. Besides, photochemically orthogonal deprotection of PPGs by choosing different irradiation wavelength is feasible.

Palladium catalyzed coupling reactions using water-soluble phosphine ligands: DTBPSP and DAPSP and their ability to promote Suzuki-Miryaura, Heck, Sonagashira, and Carbonylation reactions. ***William S. Brown*, Kevin H. Shaugnessy, Sara E. McClendon, Marry E. Killian, D. Denise Boykin, and M. QuentinSonnier. Department of Chemistry and Center for Green Manufacturing, The University of Alabama, Box 870336, Tuscaloosa, AL 35487-0336.**

The development of water-soluble phosphine ligands for coupling reaction has been an expanding area of research over the past several years. The goal in many of these new reaction conditions has been to improve overall yield, reduce reaction time, and allow for catalyst recyclability. The motivation of this research is to demonstrate the utility of the ligands di-tert-butylpropylsulfonlyphosphine (DTBPPS) and di-adamantyl-propylsulfonylphosphine (DAPPS) as alternatives to other water-soluble ligands (such as TXPTS, TMAPTS, t-BuAmphos etc) which offer an alternative to ammonium based water-soluble ligands (Buchwalds ligands or t-BuAmphos) previously used. Previous efforts suggest that increasing the sterics by addition of sterically demanding groups and increasing the electron donation ability of the phosphine ligand leads to an increase in the reactivity of the phosphine palladium catalyst. This increase in reactivity results in lower catalyst loading and higher turnover frequency of the catalyst, thereby providing a reduction in reaction time. Additionally, an increase in water-solubility of the active catalyst should afford means for the coupling of substrates that previously have proven challenging due to low solubility in traditional organic solvents. Both DTBPSP and DAPSP have been investigated and shown to give isolated yields between 75-98% for Suzuki, 68-92% for Sonagashira, and 75-99% for carbonylation, which are comparable to or in certain cases better than other water-soluble phosphines previously investigated.

Phenol Formaldehyde Nanocomposite Preparation with Tetraethylorthosilicates ***Zachary Whitfield*****, Mary Rogers, and Adriane Ludwick, Tuskegee University. Tuskegee, AL 36088.**

The objective of this project is to study what effect incorporating nanosilicates will have on prepared resol polymer resins. The method being used to incorporate the nanosilicates throughout the polymer's matrix is a sol-gel process. Previous studies have shown improvements in thermal stability with the use of this method on novalac polymer resins. A comparative study is being done between phenol formaldehyde polymer resins and 1:1 phenol/p-bromophenol formaldehyde polymer resins. Preliminary studies were conducted to obtain a procedure for producing void-free polymers, to monitor the swelling process, and to monitor silicate uptake levels. This project is possible because of NSF/IGERT funding.

PLANNING EXPERIMENTS USING SIX THINKING HATS. ***M. B. Moeller*****, Dept. of Chemistry and Industrial Hygiene, University of North Alabama, Florence, AL 35632.**

"Six Thinking Hats" is a system developed by Edward De Bono for guiding decision making, particularly for decisions in the business arena. The six hats process has been adapted for the purpose of teaching experimental design. Each aspect of planning for an experimental project is considered separately in six deliberate steps. The steps are interconnected, so that in performing the sequent of steps, previous steps can be revisited. The blue hat (sky) considers the overarching questions of purpose and goals for the experiment. The green hat (harvest) involves gathering information already available. The white hat (spreadsheets) deals with the information sought and with developing experimental protocol. The red hat (danger) entails recognizing potential hazards in the experiment. The yellow hat (action) looks for preliminary experiments can provide information to refine the experimental design. The black hat (devil's advocate) attempts to find weaknesses in the experimental design. The six hats process is well suited for team efforts although the programmed, compartmentalized thinking can also be useful to an individual. The process has been used to plan for an experiment to determine the water content of recently discovered species of flatworms that apparently go through anhydrobiosis to survive desiccation.

Reaction of 1,4-dicyclopropyl-1,3-butadienes with 4-methyl-1,2,4-triazoline-3,5-dione (MTAD) ***Duk K. Kim(1)*****, Kevin E. O'Shea(2), and Christopher Gomez(2). (1) Department of Physical Sciences, Auburn University Montgomery, Montgomery, AL 36124 (2) Department of Chemistry and Biochemistry, Florida International University, Miami, FL 33199.**

The reaction mechanisms of MTAD with isomeric 1,4-dicyclopropyl-1,3-butadienes (DCPBD) were tried to be explained. The E,E and E,Z isomers of DCPBD react with MTAD to produce only the corresponding stereospecific 4+2 adducts. On the other hand, the reaction of Z,Z isomer with MTAD yields two 4+2 adducts and two 2+2 adducts. According to the Woodward-Hoffmann orbital symmetry rule, the [2+2] cycloaddition reactions are thermally forbidden. So the experimental results from the [2+2] cycloaddition reactions of DCPBD with MTAD seem to contradict the Woodward-Hoffmann rules if the reactions were working with concerted way. While the E,E and E,Z isomers show no trappable intermediates, the Z,Z isomer showed numerous methanol adducts. The nonstereospecificity and methanol adducts observed during the reaction of MTAD with the Z,Z isomer suggest the involvement of an open zwitterion. Low temperature NMR experiments reveal the presence of an aziridinium imide (AI) intermediate. We propose a concerted mechanism for the E,E and E,Z isomers and a non-concerted mechanism involving both open and closed (AI) zwitterionic species in the reaction of MTAD with the Z,Z isomer. Acknowledgment: This work was partially supported by AUM New Faculty Research Grant-In Aid.

RECOLLECTIONS OF A HYDROGEN CYANIDE CHEMIST. Richard C. Sheridan, Tennessee Valley Authority (Retired), Sheffield, AL 35660.

This paper reviews the experiences of a shift chemist in a hydrogen cyanide and acrylonitrile chemical plant in the 1950s. Then it discusses research done at Muscle Shoals, Alabama, in the 1960s on the synthesis of oxamide, a potential slow-release nitrogen fertilizer, from hydrogen cyanide (HCN). HCN was oxidized to cyanogen which was hydrolyzed to oxamide in concentrated hydrochloric acid. The oxidizing agents were regenerated for recycle. After studying the individual steps, including the synthesis of HCN from methane and ammonia or formamide, the four-step procedure using nitrogen dioxide was combined and operated in the laboratory. The use of a plasma torch to make HCN and the formation of oxamide from HCN and hydrogen peroxide were also investigated. No economical method was found for the production of oxamide as a fertilizer and the project was discontinued.

STUDIES OF ISOMERIC GEOMETRY AND PROPERTIES OF ENERGY-RICH NITROGEN CLUSTERS.

***Oluwaseyi Ogebule*, Essence Brice, Geaneé Quinney, Jong Hwa Kim, Jamiu A. Odutola, Department of Chemistry, Alabama A. & M. University, Normal, AL 35762.**

Poly-nitrogen clusters have potential as an alternative source of fuel. Nitrogen clusters, ranging from N12 to N60 sizes, their isomers and geometries are built and their energetics studied using quantum mechanical methods in order to understand how much energy these molecules can store or release. The most stable conformation for each of the structures is obtained by geometry optimization and confirmed by frequency calculations using ab initio and DFT [B3LYP] methods with the 6-31+G(d) basis sets. Single point energy for each optimized structure is calculated by using larger basis sets, such as 6-311+G(3df). Nitrogen cluster molecules with the molecular formula N2n are found to be most stable than N2n+1. Based on our calculations, it appears that the geometry favors formation of stable single-bonded nitrogen cluster molecules. This work was made possible in part by a grant of high performance computing resources and technical support from the Alabama Supercomputer Center.

PALLADIUM CATALYZED SUZUKI COUPLING WITH WATER-SOLUBLE PHOSPHINE LIGANDS TO PROMOTE ACTIVATION OF ARYL HALIDES.

***M. Quentin Sonnier*, William S. Brown, Kevin H. Shaughnessy, Department of Chemistry, The University of Alabama, Tuscaloosa, AL 35487-0336**

The development of new reaction conditions for Suzuki a coupling reactions has become an area of interest over the past several years. Previous studies have been undertaken with moderate to good yields under relatively benign reaction conditions. Our motivation is to utilize water-soluble phosphine derivatives to improve on these reaction conditions, improve yields, reaction time, allow for reactions to be carried out at ambient temperature, and lower catalyst loading. It is thought that increasing electronic donation into the palladium metal center from the phosphine will aide in oxidative addition into the aryl halide bond. Additionally it is thought that sterically demanding groups on the phosphine ligand increase subsequent reductive elimination or migratory insertion steps. Water-soluble phosphines have been developed to be electronic releasing and sterically demanding, while offering potential for recyclability due to water solubility. Moreover, the water-soluble ligands we have developed are phosphonium salts, which are easily deprotonated, that offer greater stability when shipping or in open atmosphere. The use of the water-soluble ligand, 3-(di-tert-butylphosphino)propanesulfonate (DTBPSP) has demonstrated good activity towards Suzuki coupling of electron rich and deficient aryl bromides with 73-84% yields at room temperature. The water-soluble ligand 3-(diadamantylphosphino)propanesulfonate (DAPSP) has demonstrated activitation of electron rich and deficient aryl bromides with 64-92% yield at room temperature. Future work will include expanding these ligands to aryl chlorides. We also will be to expand these ligands to other coupling reactions and into generating palladium-ligand complexes.

Donald D. Muccio, *Bryan D. Cox*, Kenny F. Nguyen, Department of Chemistry, University of Alabama-Birmingham, Birmingham, AL 35294.

9-cis-UAB30 is a novel retinoid that is approaching clinical trials for cancer prevention. The stable conformations of 9-cis-UAB30 have been examined using a calculated torsion potential curve along the C8-C9 torsion. The energy, E, was calculated after a constrained geometry optimization as a function of the torsion angle, &#966;, at the B3LYP/6-31G* level of theory. It was found that the most energetically favorable torsion angle was ±50° (+/- s-gauche) and is dependant on the conformation of the ring system. Another favorable conformation was found at 180° (s-trans) which is 1.3 kcal/mol greater in energy than the global minimum at s-gauche. A barrier of 3.0 kcal/mol separates the global minimum at s-gauche from s-trans, and a much larger barrier at 0° separates the (+)-gauche from the (-)-gauche conformations. Populations of 9-cis-UAB30 were calculated using a normalized Boltzmann distribution. The populations for s-gauche and s-trans were found to be 82% and 18%, respectively. Using the methods described by Guo and Karplus, a series of diene models were used to analyze the steric effects that contribute to the torsion potential curve of 9-cis-UAB30.

Chemistry Posters Abstracts

A THERMODYNAMIC AND KINETIC STUDY OF ACTINOMYCIN D BINDING TO ATYPICAL –T(G)nT- SEQUENCES IN DOUBLE STRANDED DNA.

***Jason Hudson* and David Graves, Department of Chemistry, University of Alabama at Birmingham, Birmingham, AL, 35294.**

The antitumor antibiotic actinomycin D is a DNA binding agent that has been studied extensively for over thirty years. Actinomycin D has been shown to preferentially bind to dGpC steps of duplex DNA, and more recently atypical binding sites such as the T(G)nT motif. These nonclassical binding sites have potential to yield a new class of DNA binding agents that show sequence specificity to the T(G)nT motif of duplex DNA. Here, we describe a unique enthalpic "switch" present in the binding of actinomycin D to the 5'-TGGGT-3' and 5'-TGGT-3' of double stranded DNA. Utilizing isothermal titration calorimetry, the enthalpy of binding was measured and our results show a large enthalpy change (ΔH) in the binding of actinomycin D to the two sequences that only differ by the presence of one guanine. The enthalpy value switches from a favorable value of -3.8 kcal/mol for the 5'-TGGGT-3' to an unfavorable value of +2 kcal/mol for the 5'-TGGT-3'. These results suggest large enthalpy/entropy compensation present in the thermodynamic binding mechanism. A key component in the binding mechanism is the comparison of association kinetics profiles for the two sequences, which suggests a unique binding mechanism present. This may be responsible for the unusual thermodynamics associated with the binding of actinomycin D to the two sequences that differ only in the presence of one guanine.

ENHANCEMENT OF THE THERMAL STABILITY OF SALMON SPERM DNA BY INTERACTION WITH TRANSITION METAL IONS: A COMPARATIVE STUDY

Kathern Wendt **and Maureen K. Murphy. Chemistry & Biochemistry Program, Huntingdon College, 1500 East Fairview Avenue, Montgomery, AL 36106-2148.**

We have conducted thermal denaturation experiments on modified oligonucleotides and salmon sperm DNA in sodium chloride/sodium citrate solution at pH 7.0 in the presence and absence of 0.10 M aqueous metal ion solutions. In the absence of added metal ions, melting curve data for the modified oligonucleotides and the salmon sperm DNA displayed characteristic sigmoidal behavior and transition temperatures in the range of 38.30-58.90 degrees Celsius. In the presence of added aqueous metal ions,the melting curve data for the modified oligonucleotides and the salmon sperm DNA exhibited significantly higher transition melting temperatures, suggesting enhanced thermal stability in the presence of metal ions. A comparative study of our results with published research on metal ion effects on melting curves of human DNA samples will be presented.

ISOLATING LOW-MOLECULAR-WEIGHT CHROMIUM-BINDING SUBSTANCE FROM HUMAN URINE.

John B. Vincent**, Keith Bentley, Yuan Chen, and Carolyn J. Cassady, Department of Chemistry, The University of Alabama, Tuscaloosa, AL 35487-0336.**

Chromium is moved from the body stream to the tissues by the iron transport protein transferrin in an insulin-sensitive fashion. The chromium is transferred in the tissues to the oligopeptide low-molecular-weight chromium-binding substance (LMWCr), also known as chromodulin. LMWCr has been proposed to potentiate insulin signaling. Chromium is ultimately removed from cells and appears in the urine as a low molecular weight species, which has been assumed based on its size to be LMWCr; however, the identity of the chromium-containing species in urine has never been firmly established. The goal of this research is to isolate the chromium-containing biomolecule from urine for the first in sufficient quantity to allow it to be characterized by standard biochemical and spectroscopic methods to establish whether it is LMWCr.

Palladium catalyzed coupling reactions using water-soluble phosphine ligands: DTBPPS and DAPPS and their ability to promote coupling reactions.

Mary E. Killian, Sara E. McClendon, William S. Brown, and Kevin H. Shaughnessy. University of Alabama. Tuscaloosa, AL 35487.

The development of water-soluble phosphine ligands for coupling reaction has been an expanding area of research over the past several years. The goal in many of these new reaction conditions has been to improve overall yield, reduce reaction time, and allow for catalyst recyclability. The motivation of this research is to demonstrate the utility of the ligands 3-(di-tert-butylphosphino)propanesulfonate (DTBPPS) and 3-(diadamantylphosphino) propanesulfonate (DAPPS), which offer an alternative to ammonium based water-soluble ligands previously used (Buchwald's ligands or t-BuAmphos). Replacement of the ammonium group with an anionic sulfate group should provide greater electron donation by the phosphine to the metal center. Previous efforts suggest that increasing the steric demand by addition of bulky groups and increasing the electron donation ability of the phosphine ligand leads to an increase in the reactivity of the phosphine palladium catalyst. This increase in reactivity results in lower catalyst loading and higher turnover frequency of the catalyst, thereby providing a reduction in reaction time. Additionally, an increase in water-solubility of the active catalyst should afford means for the coupling of substrates that previously have proven challenging due to low solubility in traditional organic solvents. Both DTBPPS and DAPPS are being investigated in a number of coupling reactions and will be reported including Heck coupling and palladium-catalyzed enolate coupling with aryl halides.

STRUCTURE AND STABILITY OF CPG-OLIGONUCLEOTIDES THAT INDUCE TLR9 MEDIATED CELLULAR INVASION. ***Sonja C. Brooks*****, Jason S. Hudson, and David E. Graves, Department of Chemistry, University of Alabama at Birmingham, Birmingham, AL 35294.**

The focus of this research is to discern the structural and biophysical properties of small DNA oligonucleotides that induce Toll-like 9 receptor (TLR-9) mediated cellular invasion. Cell invasion (metastasis) is a significant problem in the control and treatment of breast cancer. Research in our laboratory has demonstrated enhanced cellular invasion in MDA-231 breast cancer cells by ODN-362, a 25-base (CpG) deoxynucleotide. The mechanism(s) for this induction remain unknown; however, our studies reveal key insights into the structural and sequence requirements for DNA activation of this cellular invasion process. The deoxyoligonucleotides that are effective in eliciting an invasion response have been shown to adopt multiple structural motifs including stem-loops, hairpins or duplex structures. Sequence modifications were designed to discern sequence, structural and stability properties required for initiating TLR-9 mediated cellular invasion. Our results demonstrate that these small deoxyoligonucleotides play a key role as a biological response modifier in this invasion process.

Synthesis and Characterization of New Palladium Complexes Containing Neopentyl Phosphine Ligands. Lensey L. Hill and Kevin. H. Shaughnessy, Department of Chemistry, University of Alabama. Tuscaloosa, AL 35487.

Finding optimal conditions for cross coupling reactions has become an increasingly popular field in current academic and industrial research. The oxidative addition of an aryl halide to a metal center can prove to be one of the most challenging steps in these catalytic cycles. Steric and electronic effects of bound ligands to the metal center greatly influence the activity of the metal catalyst. The goal for our research was to synthesize new palladium complexes that contain a variety of ligands with tert-butyl and neopentyl groups attatched to a phosphine center. We have found that the cone angle of the ligand affects the complexation to the palladium metal center of several of the new complexes. For example, complexation of di-tert-butylneopentylphosphine with allyl palladium chloride dimer resulted in the allyl palladium chloride phosphine adduct, which shows substantial activity in Hartwig-Buchwald amination. Many of our new compounds have been characterized by NMR spectroscopy and X-ray crystallography.

Isomerization versus Addition reactions of Maleic Acid and its Methyl Ester - A systematic study on the effect of Temperature, Concentration and Reagents/ Catalysts Nagarajan Vasumathi, *Ashley Casey* and Jill Lott, Dept. of Physical and Earth Sciences, Jacksonville State University, Jacksonville, Al 36265.

Maleic acid (cis-2-butene-1,4-dioic acid) is known to undergo isomerization on treatment with Conc. HCl in aqueous medium under reflux condition or upon treatment with aqueous bromine under UV light to form fumaric acid, the thermodynamically more stable trans isomer. The reported reaction mechanism involves a carbocation or a free radical intermediate. Alkenes in general are known to undergo addition reactions at lower temperatures and allylic substitution at higher temperatures. There are no literature reports on the possible formation of any addition products. Allylic substitution can be ruled out since there are no allylic hydrogens in maleic acid. In an attempt to identify the formation of any addition product and to better understand the reaction mechanism for the isomerization process, a systematic study is undertaken. The reaction is performed under different conditions by varying the temperature, molar concentration and reagents/catalysts and monitored and analyzed by TLC. Our preliminary studies indicate the addition reaction taking place initially at room temperature followed by rotation, isomerization and elimination at higher temperatures. The results from the reactions of maleic acid with aq.HCl and aq. Br_2 under different conditions are compared; the products are characterized and the mechanism is discussed. The reactions of the corresponding methyl ester with HCl in ether and with Br_2/CCl_4 will also be explored.

Chemistry (Alabama Undergraduate Research Symposium) Paper Abstracts

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HEAVY METAL MOBILIZATION FROM COMPOST MANURE. Nixon O. Mwebi, *Jacob W. Boydston*, Megan Dingler, Department of Physical & Earth Sciences, Jacksonville State University, Jacksonville, AL 36265.

Compost is relatively inexpensive compared to commercially available fertilizers. This coupled with it being an environmentally safe, agronomically advantageous, and soil enriching material makes its use very attractive. This is even more evident given the long term adverse effects that may result form excessive use of commercial fertilizers to enrich nutrient deficient soils. On the other hand, compost manure may also contain heavy metals such as lead, cadmium, and arsenic, some or all of which may be bioavailable. The content and bioavailability of these metals from the compost material depends on its source as well as its composition which often includes wood chips, soil, or other organic materials. However, information regarding these factors is rarely available for a given bag of compost manure. A study of the content and mobilization of these heavy metals is eminent given the extensive use of the manure and the dangers associated with heavy metals. In this study, the concentration levels of the heavy metals lead, cadmium, chromium, arsenic, and iron from commercially available compost manure used in lawn gardens of Northeastern Alabama will be investigated as well as the possibility of the heavy metal mobilization.

MODIFICATION OF POLYCARBONATE BY EXCIMER RADIATION. Emanuel A. Waddell and *Stephen Shreeves*, University of Alabama in Huntsville, Huntsville, AL, 35899, Holly Carrell and Christopher Perry, Oakwood College, Huntsville, AL 35896.

Polycarbonate is a ubiquitous polymer in society – finding utilizing in the manufacture of compact disks, household plastics, and in medical devices. The research discussed in this presentation examines the effects of excimer radiation on polycarbonate. The excimer radiation was in the form of laser energy (193 nm) or incoherent excimer light (222 nm). These studies were conducted in order to evaluate the usefulness of this method for fabricating and or modifying microfluidic devices. In the instance of laser ablation, polycarbonate ablated at 193nm demonstrated increased hydrophilic tendencies as indicated by contact-angle measurement and electro-osmotic flow profiles. The surface chemistry of polycarbonate modified by a similar wavelength of lamp radiation (222 nm) was also studied. In general, modified polycarbonate surfaces were found to be more acidic than unmodified surfaces. This increase in acidity was supported by vibrational and UV-VIS absorbance spectra that confirmed a rearrangement of bonds around polycarbonate's aromatic rings.

Quasi-crystals: Structural, Physical & Mechanical Properties, Innovations & Applications. Nagarajan Vasumathi, *Miriem Zettili*, Dept. of Physical and Earth Sciences, Jacksonville State University, Jacksonville, AL 36265.

Quasi-crystals were first discovered in 1984, by Shechtman and his co-workers as a new class of crystal structures that are somewhere between the amorphous solids and true crystals. The first quasi-crystal discovered was an Al-Mn alloy which was formed when the molten alloy of specific composition was cooled rapidly. The electron micrograph and X-ray diffraction studies have revealed that the atoms in quasi-crystals are arranged in flat mono-layers with irregular patterns in shapes showing multi-fold rotational symmetries unlike the conventional crystals. Some quasi-crystalline materials exhibit transition from one phase to another phase called phason, a type of atomic motion not seen in ordinary crystals. During this transition the atoms undergo rearrangement causing a disorder in the structure. They exhibit long-range order in presence of short-range disorder structure. Quasi-crystals thus exhibit a number of properties due to a broad range of structural forms showing potential for many applications: spherical structure nature can be useful in storing hydrogen; photonic properties in telecommunications and computing devices; rotational symmetry for semi-conducting ability; surface properties in non-stick coatings, and as catalysts and templates for nano-structures, and many other physical properties that could be useful in building aerospace materials. Their highly complex structural features, their characteristic properties and their promising applications interested us in making a model study on simple organic compounds. Our preliminary studies indicate that simple and complex organic compounds could possibly form quasi-crystals under specific conditions.

IONIC LIQUIDS FOR ENERGY STORAGE. ***Stephen Fordham*** **and Jan Gryko, Physical and Earth Sciences, Jacksonville State University, Jacksonville, AL 36273.**

Non-toxic ionic liquids could replace water as a working medium in heat-exchange devices that store solar energy These solutions contain only safe chemicals, such as urea, glycerol, and choline chloride, which is a fodder additive. In order to prevent corrosion, water storage media must contain corrosion inhibitors. These inhibitors are not needed for ionic liquids, since these substances are non-corrosive. To investigate the use of ionic liquids as heat storage medium, we have determined the specific heat capacity of several such solutions. The classical calorimeter was used in all measurements. Our home-made calorimeter has reproduced known experimental values of heat capacity of a number of organic liquids with accuracy better than 1 %. The specific heat capacity of choline chloride based ionic liquids is approx. 2.20 J/g°C . This value is smaller than the specific heat capacity of water (4.184 J/g°C). However, for the heat storage, water can be heated only up to approx. 80 °C, whereas upper temperature for the ionic liquids is 130 - 140 °C. Since the upper temperature is higher, these solutions can store approx. the same amount of heat as water.

Chemistry (Alabama Undergraduate Research Symposium) Posters Abstracts

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Butamben Synthesis: The Fischer Esterification reaction revisited. Nagarajan Vasumathi, ***Haley Booker and Christopher Goodwin*****, Dept. of Physical and Earth Sciences, Jacksonville State University, Jacksonville, AL 36265.**

Esters of p-aminobenzoic acid (PABA), a class of analgesics are prepared by Fischer Esterification, a method, commonly employed for the synthesis of esters. This method is known to yield poor yields because it is an equilibrium reaction and also due to complexity in product isolation. Techniques to better synthesize pure samples of these compounds are still under research. As a model study, we undertook the synthesis of Butamben, the butyl ester of PABA, an analgesic known to alleviate neuropathic pain for longer period and more selectively. The removal of water, a by-product in the reaction, from the system was the biggest concern, and heavily affected the course of the reaction. Applying Le Chatlier's principle, different methods were attempted not only to improve the yield but also to achieve the isolation of much purer product. Using a Dean-Stark apparatus (glassware designed especially for the removal of water from the system as the reaction proceeds) as a tool, a better yield and purer product was obtained with reduced reaction time. The product was identified and characterized by IR and NMR spectral analysis which showed 99 % purity. The modified method of synthesis, isolation, purification and characterization are discussed. The new, improved method will be extended to synthesize other derivatives of PABA that could be optically active. Further exploration to study the effect of other catalysts on the reaction is also underway.

Development of a Quantitative Analytical Method for the Simultaneous Detection of Mixtures of n-Alkanethiols by Mass Spectrometry. Rachel Roberts and *Brian W. Gregory*, Department of Chemistry & Biochemistry, Samford University, Birmingham, AL 35229-2236.

A method is currently being developed for the quantitative analysis of mixtures of n-alkanethiols ($R(CH_2)_mSH$, where m = 1, 2, 3, ..., and R = CH_3, HO, HOOC, etc.) in solution by mass spectrometry. The purpose of this method is not only to be able to differentiate between different alkanethiols in solution mixtures, but also to be able to determine the relative amount of each type of alkanethiol that is present. Both electrospray ionization (ESI) and atmospheric pressure chemical ionization (APCI) are being investigated as a means to generate the alkanethiols as gas-phase ions for detection by mass spectrometry. These studies are part of a wider project involving the study of multicomponent alkanethiol self-assembled monolayers (SAMs), which consist of two or more different types of alkanethiols adsorbed as a single monomolecular film on metal surfaces. The overall goal of this portion of the project is to use mass spectrometry as a means of determining the surface mole fractions of the alkanethiol components contained in mixed SAMs as a function of their solution mole fractions. Preliminary data involved in the development of the mass spectrometric method for this analysis will be presented. Acknowledgements: This work was supported by a Major Research Instrumentation (MRI) grant from the National Science Foundation (Grant No. 0619217, BWG) and by the Samford University Summer Undergraduate Research Program (RR).

HEAVY METAL CONTAMINATION IN SOILS AROUND ANNISTON, ALABAMA.

Nixon Mwebi, *Bryan DeLanney*, Department of Physical & Earth Sciences, Jacksonville State University, 700 Pelham Rd. N, Jacksonville, AL 36265.

For the past several decades, Anniston Alabama has been a largely industrial town and a number of these manufacturing industries relied on heavy metals such as arsenic and cadmium in the processing of various products. Despite their usefulness, cadmium and arsenic has been labeled as a carcinogen with harmful effects to both humans and animals. The danger of exposure to the heavy metals lies in the method of exposure of the metal waste, which in the past has largely been in land fills with non-impermeable linings. In such instances, there is the potential of the metal leaching out leading to possible exposure to humans and animals through food, water and air. Effective monitoring of these carcinogens is therefore needed and in this study, levels of arsenic and cadmium around an abandoned manufacturing site in west Anniston, Alabama are determined and their potential for leaching and movement downhill explored.

Solvent and catalytic effects on the addition of bromine to DMME.

Nagarajan Vasumathi, Nixon Mwebi, *Christopher Moore and Hambolu Oluseyi*, Dept. of PHES, Jacksonville State University, Jacksonville, AL 36265.

Alkenes are known to undergo addition reactions at lower temperatures and/or isomerization at higher temperatures. Maleic acid (cis-2-butene-1, 4-dioic acid), and its corresponding methyl ester (DMME) in which the alkene double bond is in conjugation with carboxyl group, is known to undergo isomerization on treatment with aqueous bromine or Br2/CCl4 under UV light to form the thermodynamically more stable trans isomer. However, there are limited reports on the possible formation of any addition products under conditions of this study. Interesting results were observed in our studies with an attempt to standardize the conditions to achieve a more selective addition product. Dimethyl maleate (DMME), on treatment with slight excess of bromine using bromoform as catalyst and solvent gave selectively the addition product at low or high temperature conditions. However, replacement of bromoform by CCl4 for solvent had a different effect. Several reactions were carried out, varying the solvent concentration and temperature to optimize the reaction conditions. Using bromoform as a catalyst, adding reagent bromine to substrate in 1:1 ratio and CCl4 as solvent with 0.05 M concentration, under reflux conditions, we were able to achieve 95 % yield of the addition product selectively. The results of various reactions are compared, products are characterized by IR and NMR and the reaction mechanism and stereochemistry are discussed.

Earth Science Posters Abstracts

ICE-AGE MAMMALS OF ALABAMA AND THE STATE'S PALEOBIOGEOGRAPHICAL POSITION. ***Dennis R. Ruez, Jr.*****, Department of Geology and Geography, Auburn University, Auburn, AL 36849-5305.**

Ice-Age (Pleistocene) terrestrial mammals are known from at least 16 localities in Alabama, based on published records. This includes 29 species, 10 of which are extinct, and 11 of which are extant, but currently do not occur in Alabama. The localities cluster in the extreme northern part of the state, where the fossils are found in caves, and the southern third of the state, where fossils are exposed by rivers. Notable occurrences include some of the earliest discoveries of the Columbian mammoth (*Mammuthus columbi*) and American mastodon (*Mammut americanum*), one of the largest collections of the ground sloth *Megalonyx jeffersonii*, and the southernmost record of reindeer (*Rangifer tarandus*). The abundant Pleistocene fossil localities of Florida show a high degree of faunal interchange with the western US. However, during times of peak glacial advance, the inhabitable latitudinal span of North America was tightly constricted. Also, the relatively high elevation of the Appalachians would have been an additional dispersal barrier to the low-elevation adapted mammals of Florida. Therefore, analysis of Alabama Pleistocene mammals may reveal insight into the ecologic dynamics of rapid dispersal rates during times of climate instability.

Engineering and Computer Sciences Paper Abstracts

Microstructural characterization of titania coated glass microballoons and cenospheres ***Melissa L. Jones*****[1], M. Koopman[1], K.K. Chawla[1], R. Martens[2], G. Thompson[2], W.Ricci[2], M. Lalor[1], [1]University of Alabama at Birmingham, Birmingham, AL 35294, [2]University of Alabama, Tuscaloosa, AL 35487, [3]Trelleborg Emerson & Cuming, Mansfield, MA 02048.**

The photocatalytic activity of titania has great potential for water purification, however the most effective form of the material for this purpose has not yet been identified. Titania coated glass microballoons (GMBs) and titania coated cenospheres are potential candidates. To evaluate their potential to be used in water treatment, we have characterized their microstructure and examined their interfacial integrity. To investigate the interface between the GMB and the titania coating, focused ion beam (FIB) was used to prepare a section of the titania coated GMB to be analyzed by TEM. The TEM images and EDX analysis showed evidence of diffusion across the interface between the GMB and the titania coating. After dropping the GMBs from a height of 1 m into water, SEM analysis showed intact coatings. Excellent retention of titania coating during drop experiments is attributed to the good mechanical bonding of titania and silica.

HETEROGENEOUS COMPUTING ARCHITECTURES.

***Sriuivasarao Krishuaprasad*, Dept. of MCIS, Jacksonville State University, Jacksonville, AL 36265.**

High-performance computing (HPC) researchers continue to innovate techniques to harness higher computing power to meet the demands of strategic applications. Some of these approaches include multicore processors, specialized processors, and heterogeneous computing systems. While multicore model is suitable for general-purpose, multi-tasking kind of concurrency, there are many applications that require much faster processing speeds than that is offered by multicore approach. Examples of such applications include encryption/decryption, signal processing, heavy bit manipulations, and multimedia processing. Specialized processors are often used to meet the performance requirements of these applications. Some of these include vector processors, floating-point accelerators, hyper-threaded processors, and digital signal processors. As these are special-purpose processors, they are often not well-suited for traditional, scalar processing computations. Also, they are often integrated into the system as a peripheral unit thus incurring significant communication cost leading to performance degradation. A better, well-rounded approach is the heterogeneous model where multiple types of processing cores are incorporated into the same system. Computations are deployed onto the best processing core thus achieving performance gains. Cray XD1 and the IBM's Cell processor are examples of heterogeneous architectures. Cray XD1 achieves application acceleration using Field Programmable Gate Arrays (FPGA) coprocessors. The Cell processor, designed by IBM, Sony, and Toshiba, uses one conventional, general-purpose processor core and eight special-purpose synergistic processing cores. While the heterogeneous systems offer performance gains using "best-fit" cores, it is more difficult to develop programs for them.

MYSQL SPATIAL INDEXING FOR GIS DATA IN A WEB 2.0 INTERNET APPLICATION.

***Brian Toone*, Dept of Math and Computer Science, Samford University, Birmingham, AL 35229.**

Web 2.0 Internet applications are characterized in many different ways, but one feature that stands out is usability. One factor that influences usability is responsiveness, which is especially important in applications that provide an interface to large quantities of data. In the realm of Geographic Information Systems, Web 2.0 applications based on the Google Maps API (http://maps.google.com) must retrieve geographic data as the user scrolls a map to a new location. Retrieving elevation data for a road, trail, or route is particularly challenging because of the immense quantity of data that must be searched to find elevations for a relatively small number of sample points – the classic needle in a haystack problem. One additional challenge for finding elevation data is that frequently the exact locations queried are not actually stored in the database. Instead, we must find and return the elevation of the nearest neighbor. Overcoming these challenges to find relevant data quickly is imperative to maintaining the responsiveness. This investigation explores MySQL spatial indexing as means of improving the performance of elevation data retrieval.

Our experimental setup compares the amount of time required to retrieve elevations for 10 sample points vs. the type of database index used and the size of the dataset. We report results that indicate a significant performance improvement when using a MySQL spatial index compared to the results obtained when using a traditional B-Tree index.

Skin Temperature Increase during Millimeter Wave Irradiation; Effects of Blood Flow. ***Carmen D. Zirlott*** **and Dr. David A. Nelson, Dept. of Mechanical Engineering, University of South Alabama, Mobile, AL 36688.**

Electromagnetic energy of radio frequency (RF) is known to cause tissue heating. For radiation in the millimeter wave band (MMW; 30 GHz-300 GHz) the energy absorption is very superficial, within 0.5mm of tissue. The purpose of this work is to assess the feasibility of using MMW heating and non-contact thermometry to measure the rate of blood flow to the skin. This technology could have significant clinical and research applications such as characterization of peripheral circulation in the management of Diabetes Mellitus. We hypothesize the rate of temperature increase of the skin surface during MMW exposure is affected by (1) the rate of the energy absorption in the skin and (2) temperature and rate of blood flow to the tissue. We have developed an experimental method using an isolated, perfused rabbit ear preparation and a low-power, 35 GHz MMW transmitter. Surface temperatures are measured using a non-contact infrared (IR) thermography camera. Preliminary results show that skin surface temperature increases of up to 15 °C are achieved in non-perfused specimens exposed for three minutes. The rate of temperature change is decreased at higher perfusion rates. Future experiments in concert with a modeling effort will be directed at developing a detailed understanding of the relationship between MMW irradiation, skin blood flow and temperature increases. The results may be useful in the development of a novel method for non-contact measurement of skin blood flow rates.

Talking Games: Toward Speech as a Mainstream Modality. David Thornton, Mathematical, Computing, and Information Sciences Department, Jacksonville State University, Jacksonville, AL 36265.

This document describes a study of speech-based cursor control mechanisms along with a new proposed approach called NameTags. This research is intended to provide empirical user data to inform the design of future systems where one or more of the following conditions are present: real-time demands, very small targets, and moving targets. One such application of this research is in the area of video games, where subjects are often required to make quick selections on numerous small, moving objects. These findings also have implications for physically impaired subjects whose primary or only control modality is speech.

Engineering and Computer Sciences Poster Abstracts

BIOMIMETIC SELF ASSEMBLED NANO MATRIX FOR CARDIAC TISSUE REGENERATION ***Meenakshi Kushwaha1*****, Joel Anderson[1], Adinarayana Andukuri[1], Will Minor[1], Wayne Bradley2, Eiji Yahiro[2], Louis Dell'Italia[2], Ahsan Hussain[2], Ho-Wook Jun[1], [1]Department of Biomedical Engineering, [2]Department of Medicine-Cardiovascular Disease, University of Alabama at Birmingham, Birmingham, AL 35294.**

Heart failure (HF) is a major cause of death in the United States. Heart transplants constitute a treatment for limited number of patients. Necrosis at infarct area is the cause of HF. Therefore, cardiac tissue regeneration by direct implantation of human bone marrow mesenchymal stem (hBMMS) cells has been attempted. However, the mechanisms behind low stem cell viability, cardiac differentiation, and contribution to cardiac function have not been elucidated. This study aims to develop a biomimetic self-assembled nanomatrix by emulating the extracellular matrix, which provides stem cells with a protective and nurturing microenvironment. It is hypothesized that the biomimetic nanomatrix promotes viability and cardiac differentiation of hBMMS cells. The nanomatrix has been developed by self-assembly of peptide amphiphiles (PA). PAs consist of hydrophobic alkyl tails linked to hydrophilic functional peptide sequences, which are composed of an enzyme-mediated degradable site and a cell adhesive ligand. Presently, cellular behaviors of hBMMS cells are being evaluated on two dimensional nanomatrices. For in vivo studies, a myocardial infarction model has been created via ligation of left anterior descending artery in mice. hBMMS cells and cytokines, alone or together, with the nanomatrix will be injected into the infarct area via echo-guided methodology. Stem cell viability and differentiation, synergistic effects from cytokines, and their contribution to cardiac function will be evaluated.

BIOMIMETIC SELF-ASSEMBLED NANOMATRIX FOR BONE TISSUE REGENERATION. ***Joel M. Anderson*****[1], Meenakshi Kushwaha[1], Ajay Tambralli[1], Bryan A. Blakeney[1], Derrick D. Dean[2], Susan L. Bellis[3], Ho-wook Jun1, [1]Department of Biomedical Engineering, [2]Department of Materials Science & Engineering, [1]Department of Physiology & Biophysics, University of Alabama at Birmingham, Birmingham, AL 35294.**

Bone is a dense, connective tissue with an extracellular matrix (ECM) comprised of biological, organic, and inorganic components. All three components self-assemble into the complex hierarchical structure of bone tissue. An ideal strategy for bone tissue regeneration is to develop a bone ECM mimic organic/inorganic composite nanomatrix by emulating these essential properties of bone tissue formation. Thus, the bone ECM mimic nanomatrix has been successfully developed, and it is composed of peptide amphiphiles

(PAs) as an organic component, hydroxyapatite nanoparticles as an inorganic component, and human bone marrow mesenchymal stem (hBMMS) cells for biological activity. PAs consist of a hydrophobic alkyl tail attached to hydrophilic functional peptide sequences. The functional peptide sequences are made up of enzyme-mediated degradable sites and cell adhesive ligands (RGDS, DGEA, or KRSR) isolated from various ECM proteins. The nanomatrices were coated onto glass coverslips by the self-assembly of the PAs, and their ability to control cellular behaviors of hBMMS cells was investigated. Initial cell attachment studies demonstrated that the RGDS containing nanomatrix exhibited significantly greater attachment, followed by the DGEA and KRSR containing nanomatrices. Presently, the osteogenic differentiation of hBMMS cells on the nanomatrices is being studied over 21 days. This study introduces a novel strategy for bone tissue engineering.

Geography, Forestry, Conservation, and Planning Paper Abstracts

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SEASONAL VARIATION IN THE STRESS RESPONSE OF FERAL PIGS.

BRIAN L. WILLIAMS **and STEPHEN S. DITCHKOFF, School of Forestry and Wildlife Sciences, Auburn University, AL 36849. MICHAEL S. MITCHELL, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT 59812. JAMES B. GRAND, Alabama Cooperative Fish and Wildlife Research Unit, Auburn University, AL 36849. JOSHUA J. MILLSPAUGH, Department of Fisheries and Wildlife Sciences, University of Missouri, Columbia, MO 65211. RODERICK M. THORNTON, Conservation Branch, U.S. Army, Fort Benning, GA 31905.**

Stress levels were examined in a free-ranging population of feral pigs (Sus scrofa) on Fort Benning, Georgia, using fecal glucocorticoid metabolite analysis in an effort to establish when, if at all, elements of the population experience elevated stress levels. Samples were collected from both trapped and hunter harvested animals. Sexually mature pigs on Fort Benning showed two seasons of elevated stress levels corresponding with two distinct periods of increased farrowing activity. Fecal glucocorticoid levels were highest among mature females and lowest among mature males during the peak farrowing seasons. Among males, this is likely due to a decrease in breeding activity during these seasons as the majority of receptive females were already pregnant. This is further evidenced by the fact that fecal glucocorticoid levels peaked among mature males during the two periods immediately preceding each breeding season. Fecal glucocorticoid concentrations did not fluctuate significantly among immature individuals of either sex. Individuals collected from traps exhibited greater fecal glucocorticoid concentrations than individuals collected via hunter harvest. The timing of peak stress levels among both sexes of mature animals and the lack of fluctuations in stress levels among immature animals lead us to conclude that the timing of peak reproductive activity is the major factor influencing stress among this population of free-ranging feral pigs.

SOCIALSTRESSINAPOPOULATIONOFWHITE-TAILEDDEER(ODOCOILEUS VIRGINIANUS). ***J. Clint McCoy*** **and Stephen S. Ditchkoff, School of Forestry and Wildlife Sciences, Auburn University, Auburn, AL 36849.**

Wildlife managers typically simplify management plans so that they are easily understood and implemented by interest groups. White-tailed deer management is a prime example, where we simplify population management to include prescriptions designed to control or manipulate density, sex ratio, and buck age structure. In some cases, management plans on individual parcels of property intensify their respective programs to increase the number of large-antlered deer that are produced, and exceed carrying capacity of the area. A potential flaw of this approach to management is that it assumes if the deer are adequately fed then they will be healthy, thus, maximizing growth and antler development. However, this common assumption fails to consider many less obvious factors that influence health of deer, one of which is stress. Deer exposed to abnormally high densities and/or increased levels of agonistic interactions can experience chronic stress, which has been shown to negatively influence body growth, antler development, and reproduction. In response to stress, deer secrete glucocorticoids which are eventually metabolized and excreted in feces. We collected feces from a population of deer maintained at high density (>100 deer/sq. mile), with an estimated sex ratio of 2 bucks:1 doe, and a large proportion of mature males to measure glucocorticoid concentrations and develop a stress profile of the population. We will discuss our findings and outline the potential consequences of these population characteristics.

UNIVERSITY OF ALABAMA GAMEDAY: OPPORTUNITY FOR 'GREEN SOLUTIONS'. ***Crystal J. Taylor*****, Dept. of Geography, Univ. of Ala., Tuscaloosa, AL 35487. Jeffrey P. Richetto, Department of Geography, University of Alabama., Tuscaloosa, AL 35487.**

Football gameday at the University of Alabama has grown to encompass a wide array of recreational opportunities for 100K plus fans both on campus and in the stadium. The enormous influx of people not only entails a high level of vehicular and pedestrian traffic, in a relatively confined geographic area, but also creates a significant environmental footprint. This study identifies and develops efficient/effective waste management strategies that minimize a gameday's environmental impact. With the combined cooperation of different campus organizations along with local city services, there exists a variety of resources to implement reuse and/or recycling programs to support a more sustainable campus/community environment. During a typical gameday it is the plastic waste (gameday souvenir plastic cups) that represents the primary component of the recycling opportunity, whereas paper waste represents a smaller, secondary component. In fact, tens of thousands of souvenir cups are discarded across campus and in the stadium each home football game and end up deposited in the City of Tuscaloosa's landfill site. The study includes an overview of the history of waste recycling and incorporates some of the novel 'green' practices currently being implemented by the Philadelphia Eagles professional football franchise. The project also includes strategies for reuse such as using gameday cups in conjunction with a plant life-cycle lesson plan to local elementary schools. Finally, because not all materials are recyclable, the project investigates whether the current souvenir plastic cup should be replaced and, if so, who are the potential outside suppliers.

Health Sciences Paper Abstracts

ALABAMA HIV SCHOOL HEALTH POLICIES: RELATING CONTENT STANDARDS TO VITAL STATISTICS. ***Dr. Gayle L. Bush, PhD*****, Troy University; Terry Watkins, RN, FNP Candidate, Troy University; Vernon Shank, MS Candidate, Troy, AL 36082.**

According to the CDC, HIV-related education and infection control policies have been established, curriculum guidelines developed, and educators trained in the delivery of effective HIV prevention education. Based on a recent study of school districts nationwide, 67% required HIV education for students and 90% provided teacher preparation in the area of HIV education. The Youth Risk Behavior Surveillance Survey (grades 9-12) of 2005 reports that prevalence of having been taught in school about AIDS or HIV infection ranged from 77.9% to 93.6% across state surveys (median: 88.4%). The Alabama Course of Study Health Education provides the course requirements, standards, and curriculum for HIV education, which is to occur in grades K-12. State Code 16-40A-2 (2003) specifies that "any program or curriculum in the public schools in Alabama that includes sex education or the human reproductive process shall, as a minimum, include and emphasize" abstinence as the only method that wi ll prevent HIV, STD, and pregnancy. According to the CDC recommendations, key concepts that that should be included in the comprehensive sex and HIV education program will be discussed. This session will focus on helping educators understand what is required to teach at certain grade levels, and provide tips and strategies for teaching this important health issue in the K-12 environment.

DOMESTIC VIOLENCE PERCEPTIONS OF WOMEN IN URBAN AND RURAL AREAS. ***Chelsie N. Noland*** **and Ellen Buckner, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294-1210.**

This study explored perceptions of domestic violence (DV) among women in rural and urban settings. It investigated a) what women identify as domestic violence, b) the reasons, ways, or means that they would report domestic violence, c) the barriers and facilitators to reporting domestic violence, and d) how they view the nurse as a resource. Women (n = 30, 15 rural, 15 urban) were recruited from emergency departments in rural and urban hospitals. Rural women face barriers, which result in underreporting of domestic violence, including physical isolation, economic isolation, and lack of transportation. Women in rural areas are reluctant to report abuse due to fear that they will be ignored, ridiculed, or blamed. Others reasons for failure to report DV include privacy, sense of obligation to their family/marriage, and lack of anonymity, which may lead to retaliation from the abuser. The Rural Health Nursing Model (Long and Weinert, 1999) describes ways that rural cultures are distinctive. This study described women's perceptions of the problem of domestic abuse in their community related to this model. Women from rural and urban communities completed an investigator-designed survey. There was a difference regarding whether they identified domestic violence as a problem. Compared to urban residents, rural women stated DV was not a problem in their community, and the difference approached significance (p=.052) which may validate underreporting. Respondents described numerous forms of possible violence—physical, verbal, sexual. Implications for nursing include developing mechanisms for increasing community awareness and combating violence in rural communities.

EFFECT OF STATE-TRAIT ANXIETY ON PAIN PERCEPTION IN CHILDREN WITH IV INSERTIONS ***Kristina Ray*** **(Ellen Buckner), University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL, 35294-1210.**

Pain and pain perception are affected by various factors making pain a subjective experience. Some children may see needle stick as the most frightening and painful experiences that they have while in the hospital. Many methods have been used to reduce this pain. Some children still perceive pain even with the use of analgesics. Studies have looked at the effect various factors have on pain, but few have looked at the effects of state and trait anxiety on pain perception. The purpose of this descriptive study was to examine the relationship between state and trait anxiety and compare previous IV exposure, maturity levels, relationship to parents and pain perception occurring around the experience of receiving an IV in the emergency department. Children ages 9-12, English speaking, at emergency department for a non-life threatening visit, and receiving an IV were invited to participate. All participants used the Synera® topical anesthetic patch for IV insertion. Parent consent and child assent were obtained. The Synera® patch provides topical pain relief, leaving pain responses more selectively psychological. This IRB approved study used State-Trait Anxiety Inventory for Children (STAIC, 1973) to determine state-trait anxiety levels prior to IV insertion and the Wong-Baker FACES Pain Rating Scale to assess perceived level of pain after IV insertion. Preliminary findings demonstrated more contrasts in observed behavior than were detectable on the STAIC. Maturity level and prior experiences with IV's strongly influenced responses. Data collection is still in progress. Nurses must assess numerous variables in intervening to provide comfort to children experiencing painful procedures.

ENVIRONMENTAL EFFECTS OF AIR QUALITY: THE IMPACT OF AIR ON ASTHMA

***Linda Gibson, MSN, RN, AE-C1*; Lisa South, DSN, RN[2]; Debra Baldwin, CRNP, MSN, MBA[2]; Blaire Jones, BSN student[2]; and Ellen Buckner, DSN, RN[2] [1]Remington College of Nursing, Orlando, FL [2]School of Nursing, University of Alabama at Birmingham. Birmingham, AL, 35294-1210.**

The overall objective of the presentation is to describe the effects of air quality on asthma campers during the 2007 Young Teen Asthma Camp. It was hypothesized that poor air quality would negatively affect the participant's physical adaptation measures. The presentation will identify factors contributing to poor air quality and the effect on asthma teenagers in a camp environment. The Young Teen Asthma Camp was held for participants ranging from 11-17 years over four days and three nights in 2006 and 2007. This camp was held in southeastern United States region while ongoing wildfires spread throughout Georgia and Alabama in summer, 2007. A registered nurse observed all medication administration per home schedule and was accessible constantly for camp participants. Comparative data were analyzed between 21 participants from 2006 and 18 participants from 2007. Specific physical adaptation measures evaluated for each participant including peak expiratory flow and tolerance of asthma symptoms. Normal peak expiratory flow was based on participant's age and height specific to the peak flow device. Tolerance of asthma symptoms included participant complaints and as needed medication administration required throughout the camp. Preliminary analysis has been conducted on a sample size of 39 participants over a two year period. Data was entered into SPSS program and was password protected. Descriptive statistics established the average age of the participant in 2006 was 13.7 years and 2007, 14.34 years. Baseline peak flow measures averaged 412 L/min in 2006 and 398 L/min in 2007. Findings revealed an environmental factor such as air quality has significant impact on asthma.

LEARNING STYLES OF RNS ENROLLED IN AN ONLINE NURSING PROGRAM.

***Anita Smith*, College of Nursing, Univ. of S. Ala., Mobile, AL, 36688.**

Technological advances assist in the proliferation of online nursing programs which meet the needs of the working nurse. Understanding online learning styles permits universities to adequately address the educational needs of the professional nurse returning for an advanced degree. The purpose of this study was to describe the learning styles of RNs enrolled in an online master's nursing program or RN-BSN program. A descriptive, cross sectional design was used. The Kolb Learning Style Inventory (LS13.1) was completed by 217 RNs enrolled in online courses at a Southeastern university. Descriptive statistieal procedures were used for analysis. Thirty-one percent of the nurses were accommodators, 20% were assimilators, 19% were convergers, and 20% were divergers. Accommodators desire hand-on experiences, carrying out plans and tasks, and using an intuitive trial and error approach to problem solving. The learning styles of the RNs were similar to the BSN students in traditional classroom settings. Despite their learning style, 88% of the nurses felt the online program met their needs. Implementing the technological innovations in nursing education require the understanding of the hands-on learning of the RN so that the development of the online courses will satisfactorily meet the needs of the nurses who have chosen an online program. This research study was supported by the funding provided by the University of South Alabama Research Council.

LUNG CAPACITIES AT JUDSON COLLEGE. ***Jessica Mosley*****, Tia McClenney, Tonya Morgan, Jessica Lawson, Department of Biology, Judson College, Marion, AL 36756.**

Lung capacities at Judson College and in the surrounding area were tested in order to compare total lung capacity as it correlates to age, sex, smoking, regular exercise, musicianship as it applies to lung usage, and recent illness. A handheld spirometer was used to test lung capacities in a sample population of fifty-eight people, and including 7 males and 51 females, with an average age of 24 years of age for males and 21 years of age for females. Larger total lung capacities were demonstrated by males, those under 30 years of age, smokers, regular exercisers, non-singers or woodwind instrument players, and those with a recent illness. Several of these findings are expected, but some are surprising.

PERCEPTIONS AND EXPERIENCES OF HIV-POSITIVE, AFRICAN-AMERICAN WOMEN FROM HIV DIAGNOSIS TO PRIMARY CARE. Larry Slater, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL, 35294-1210.

Since the onset of the HIV/AIDS epidemic, healthcare professionals have struggled with HIV-positive individuals delaying medical care after diagnosis. Among those that delay, African-American women have proven to be at increased risk. Research with this population is needed to determine barriers faced in seeking care and reasons why care is delayed. This study's purpose was to examine the lived experience of HIV-positive, African-American women, including: (1) perceptions and experiences from HIV diagnosis through current care; (2) perceived factors for quick entry into care or delaying care; and (3) trends over time in several demographic variables. A survey aided in the determination of individual timelines and provided demographic information at each point. Interviews captured perceptions and experiences along the timeline. Content analysis was used to determine themes at each point. The major themes that emerged were: (1) death sentence, fright, and embarrassment (initial HIV diagnosis); (2) understanding, good or better, and impersonal (post-test counseling); (3) medications and support (first primary care visit); and (4) medications and living (current care). Paired t-tests determined changes in demographic variables. Results showed significant increases ($p<0.01$) in healthcare utilization and condom use and a significant decrease ($p<0.05$) in employment. This study explored the complex issues that affect the lives of HIV-positive, African-American women. Further study is needed to develop interventions based on their experiences to ensure quick entry into care after diagnosis.

QUALITY OF LIFE IN ADOLESCENTS POST-BONE MARROW TRANSPLANT.

Blaire M. Wouters Jones **and Ellen B. Buckner, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL, 35294-1210.**

The purpose of this study is to gain a better understanding of the lived experience of bone marrow transplant in these adolescents as it affects daily adaptation and quality of life. This study examined quality of life in two (2) different adolescents who had BMT as treatment for an acute leukemia. The first participant was a 12-year-old African-American male who was 1 year post-BMT. The second participant was a 14-year-old Caucasian female 6 years post-BMT. The Children's Oncology Group (COG) has defined health-related quality of life as a "multidimensional construct…incorporating both subjective and objective data". The Pediatric Cancer Quality of Life Index Adolescent Short Form (PCQL-32) (Varni, et al., 1998), which is sub-scaled by symptom category, and an investigator-designed interview guide were the instruments used. The investigators recoded the PCQL-32 according to the Roy Adaptation Model of nursing, with primary and secondary adaptive categories for each item. Data collection took place either in person at a southeastern pediatric hospital's outpatient clinic for bone marrow transplant, or via phone interview and mail of questionnaire for long-distance participants. Data indicate a greater burden of morbidity in the symptom category of cognitive symptoms and in the adaptive mode of self-concept. It has also been indicated that when nurses, nurse practitioners, or doctors take time to engage in interaction with the adolescent outside of the sick-patient role, a great positive impact on quality of life is seen.

SEX EDUCATION: WHAT IS IT GOOD FOR?

Nancy Clark **(Ellen Buckner), University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294-1210**

Despite federally-funded sex education in public schools, statistics have shown a remaining problem with the incidence of sexually transmitted infections and risky sexual behavior among our youth; The Medical Institute for Sexual Health published a study indicating that more than 15 million new cases of sexually transmitted infections occur each year in the United States. An extensive review of literature reveals that further study is needed in order to develop an effective sex education program. The purpose of this study was to identify specific parameters of a sex education curriculum that would be effective in reducing sexual risk behaviors among young adults and adolescents based on the recommendations of young adults, ages 19-25 years old. The data collected for this qualitative, descriptive, IRB-approved study came from guided interviews with young adults who are full-time college students. The interview guide was developed by the investigator and reviewed by three qualified researchers with a background in either sex education or nursing. This population was chosen because of their unique ability to describe what would be effective in developing healthy sexual decision making skills. Most (83%) of participants identified comprehensive sex education as the optimal type of sex education to receive in high school.

Elements identified which could improve sex education were state certified sex educators, peer grouping with case studies emphasizing healthy decision making and continuing programs that are progressively more thorough throughout the educational experience.

SEXUAL HISTORY AND FOLLOW UP: WHAT DRIVES PRACTICE? A COMPARISON OF USA AND HONDURAS *Heather Simechak Mullin* and Ellen Buckner, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL, 35294-1210.

The sexual history is often overlooked in today's nursing care. Yet the US spends 13 billion a year in sexually transmitted infection treatments, while sexual history taking is disregarded because it is "uncomfortable, unimportant, and time consuming." This descriptive study is designed to assess nurses/students' attitudes, beliefs, comfort levels, actual attainment, and importance to practice as it pertains to a sexual history. The study was designed in two phases; assessing nurses/students from Honduras and from the US. English and Spanish versions of the investigator designed questionnaire were available. Nurses and students from a wide population of nursing areas and levels of student nursing skill were sampled (n=187). Participants cited the most common reasons for not obtaining a sexual history are: "age," "patient not treated for sexual problems," and "clinical time constraints." Nurses and students felt the most important aspects of a sexual history were: past and present sexually transmitted infections, number of partners, and methods of contraception. Statistically significant data showed that nurses (p=.005) were more comfortable, had more preparation, and obtained sexual histories more often than students. However, statistics illustrated that the Hondurans (p=.000) were the most comfortable, obtained the most histories, and had more preparation than the US counterparts. 68% of participants obtained a sexual history "sometimes" or "never." All research was approved by UAB IRB and reviewed for local context by research ethics officials in Honduras.

SUDDEN CARDIAC DEATH AND THE PRE-PARTICIPATION SCREENING OF STUDENT ATHLETES AT TROY UNIVERSITY. *Jennifer L. Smith*, Janet L. Gaston, Department of Biological & Environmental Sciences, and Chuck Ash, Department of Athletic Training, Troy University, Troy, AL 36082.

While sudden cardiac death in any individual is heartbreaking for family members and friends, it can be particularly devastating when it occurs in a seeming well-trained, physically-fit, and healthy student athlete. Although uncommon in competitive sports, sudden cardiac death is a health issue physicians and athletic trainers attempt to prevent by providing pre-participation screening programs consisting of medical history questionnaires and physical exams. Noninvasive testing, such as electrocardiograms, can enhance cardiovascular screening; however, there are limitations and cost effectiveness considerations. Troy University, a relative small university with seventeen (17) different sports, takes pride in its thorough pre-screening examination (PPE) program for student-athletes, who are given clinical physical exams, electrocardiograms (ECG), medical history questionnaires, stress tests, and echocardiograms if factors deem necessary.

PROCESS AND MEANING IN MEDICARE PART D DECISION-MAKING. ***Katherine B. Tilden*, School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294.**

While the Centers for Medicare and Medicaid Services seems to evaluate the success of the new Medicare Part D prescription drug benefit in terms of enrollment numbers, a nonanecdotal study of the impact of the new benefit on the health care decisions of beneficiaries is not currently available. This qualitative nursing research study sought to investigate Medicare Part D beneficiary decision-making by asking how were decisions made and how beneficiaries perceived the meaning or significance of that process? A diverse group of low and high income Medicare beneficiaries (n = 15) from senior citizen centers participated. An open-ended investigator-designed interview was used for this IRB-approved study. Overall, participants reported that their experiences with Medicare Part D were not frustrating or overwhelming. Regardless of economic or health status in some cases, participants' decision-making practices emphasized the importance of ease and convenience in obtaining some type of prescription drug coverage whether through a pre-existing retirement package or enrollment in a Medicare plan. Importantly, though, participants who identified critical evaluation and comparison of Medicare drug plan offerings as a priority in their lives also tended to express the need to cover the expenses of many prescriptions within the confines of fixed income restrictions. The results of this study may help increase awareness of how seniors make important health care decisions in the face of the increasing choices made available by the Medicare Part D benefit. This study was supported by the UAB Center for Aging.

Health Sciences Posters Abstracts

Adolescent Diabetes Self-Management ***Beverly Myers, RN, MSN, MA, AHNP*** **Advisor: Carol Dashiff, RN, PhD, LMFT. University of Alabama at Birmingham, Birmingham, AL, 35294-1210.**

Purpose: The purpose of this qualitative descriptive pilot study was to develop an understanding of the perceptions of adolescents with Type 1 Diabetes Mellitus (TIDM) regarding the influence of parents and significant others on the development of diabetes self-management. Research Questions: Who do adolescents regard as significant in fostering their diabetes self-management? How are these individuals helpful? How significant are parent figures during this transition compared to others? Background: Adolescents with T1DM must learn to self-manage their diet, exercise, and insulin. Poor diabetes self-management can lead to negative health outcomes. A clear understanding of adolescents' perceptions about important sources of support may lead to an increase in positive health outcomes. Methods: A convenience sample of 23 adolescents with T1DM, aged 16 to 18 years participated. Adolescents were included if they were diagnosed with T1DM for > 12 months; had no other chronic illness; and spoke English. Adolescents who lived in two-parent or single-parent households or households headed by a designated legal guardian participated. Semistructured interviews were audiotaped and transcribed verbatim. Qualitative content analysis was performed. Coding categories were established separately by three coders. Qualitative themes were summarized descriptively. Research rigor was ensured by the use of a detailed audit trail. Findings: The overall results indicate that late adolescents with T1DM perceive their parents' support as the most important facilitator for their development of diabetes self-management. Late adolescents independently manage their diabetes but they still appreciate their parents' diabetes care reminders and their parents monitoring of their metabolic control.

CORRELATING FUNCTIONAL GASTROINTESTINAL DISEASES WITH PSYCHOLOGICAL PROFILES.

Carol A. Leitner, M.D., Department of Surgery, University. of Alabama at Birmingham, Birmingham, AL 35294. ***Bryce L. Roberts*****, University of Alabama at Birmingham, School of Public Health, Birmingham, AL, 35294-1210.**

Functional gastrointestinal disorders (FGID's), such as irritable bowel syndrome and functional dyspepsia, are the most frequently diagnosed gastrointestinal diseases in the United States. It is commonly accepted that these illnesses represent an aberration in the mind-gut interaction that cannot be demonstrated with any laboratory test, X-ray, or endoscopic evaluation. The high co-morbidity rate of functional gastrointestinal diseases, such as irritable bowel syndrome, with major psychiatric disorders suggests that FGID's may be part of a global patient disorder with expression in both the psychiatric profile and gastrointestinal function of the patient. This project utilized the application of the SCL-90-R to evaluate the psychological status of patients for correlation with the absence or presence of functional gastrointestinal disease. Twenty-four patients with FGID and twenty-three controls were entered into the study. The high incidence of psychological distress as measured by the SCL-R-90 in the patients with FGID helped to identify those patients with FGID's, to corroborate the diagnosis of FGID, and to suggest possible treatment options for both the psychological and gastrointestinal components of the disease.

PARENTAL CAREGIVER ROLES AND PERSPECTIVES ABOUT DIABETES SELF-MANAGEMENT DURING LATE ADOLESCENCE: A qualitative descriptive study

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Introduction: Parents are the principal managers of the complex regimen of children's Type 1 Diabetes Mellitus (T1DM) care. During late adolescence, metabolic control declines and parents may resort to methods of promoting self-management that compete with their adolescent's developing autonomy (e.g., using parental authority and control). Research Question: What are the experiences of parent(s) regarding their role in their 16- to 18-year old adolescents' self-management of T1DM over the previous year? Procedure: In this

Dean's award funded study, researchers used semi-structured questions and probes during interviews with 23 families of 16- to 18-year old adolescents with T1DM. Three coders separately, then collaboratively, analyzed the transcripts, which ensured descriptive and interpretive validity, as well as inter-rater reliability. Results: Positive and neutral feelings centered around sub-themes of "feeling better now" and "being on top of it", describing adolescent T1DM self-management. Parents worried about teen T1DM care while away from home and stated that intruding, scolding, and judging their adolescent were major obstacles in supporting adolescents' T1DM self-management. Conclusion: Parents struggled with letting their teens assume control of T1DM management. They did not completely trust the adolescents' ability to adhere to T1DM regimen fearing the consequences (i.e., death, chronic stages, and complications of diabetes) of poor adherence. Nurses can help parents gain the knowledge necessary to motivate and sustain autonomy in their adolescents' T1DM care.

PARENTAL INFLUENCE IN LATINO ADOLESCENT SEXUAL ACTIVITY: A LITERATURE REVIEW. Vanessa P. Gaioso, School of Nursing, University of Alabama at Birmingham, AL 35294. Lynda Law Harrison, School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294.

Recent national surveys have shown that the Latino adolescents have been presented the fastest-growing rate ethnic population of the United States and high birth rates before entering adulthood. One of the key public health objectives for decreasing such negative consequences has been to promote abstinence and delay of intercourse by adolescents. Moreover, studies have confirmed evidence that parenting behaviors influence, mainly, the development of positive behaviors and outcomes in youths and adolescents sexual behaviors. The purpose of this study was to present a synthesis and analysis of the literature of studies published from 1990 to 2007 that address relationships among parental influence such as parental monitoring, communication, family structure and discipline in Latino adolescent sexual activity. Articles included in this review were searched in the CINAHL and Medline databases, selecting articles that were published from 1990 to 2007 and using the key words of parental influence, Latino, adolescent and sexual activity/behavior. It contributes additional information to the existing literature on Latino adolescent and provides information needed to understand acquisition process of sexual activity in the Latino population and to design culturally appropriate health education interventions to promote delay of sexual activity.

REMODELING THE BRAIN: STRUCTURAL BRAIN CHANGES PRODUCED BY DIFFERENT MOTOR THERAPIES AFTER STROKE. *L. V. GAUTHIER, E. TAUB, C. PERKINS, M. ORTMANN, V. MARK, G. USWATTE; University of Alabama at Birmingham, Birmingham, AL, 35294-1210.

Chronic stroke patients (> 1 year post-event) were randomly assigned to receive either CI therapy (n = 16) or a control therapy intervention (n = 20). Longitudinal voxel-based morphometry was performed on structural MRI scans obtained immediately before and after patients received therapy. Patients randomized to CI therapy received intensive in-laboratory training of the more impaired arm on functional tasks for three hours daily for ten consecutive weekdays, a number of behavioral techniques termed the Transfer Package designed to facilitate transfer of therapeutic gains to real world activities, and restraint of the less-impaired arm for a target of 90% of waking hours. Control therapy patients received only the in-laboratory training component of CI therapy. As expected, the CI therapy group was far superior at generalizing motor gains achieved in the laboratory to the life situation than the control therapy group. Structural brain changes paralleled these improvements in spontaneous use of the more impaired arm for activities of daily living. The CI therapy group exhibited profuse increases in grey matter in primary sensory and motor cortex, premotor cortex, supplementary motor cortex, and the hippocampus. In contrast, the control therapy group failed to demonstrate grey matter increases. Importantly, the magnitudes of the observed grey matter increases were significantly correlated with amount of improvement in real-world arm use.

USER SATISFACTION FROM THE PERSPECTIVE OF ACCEPTABILITY IN THE FAMILY HEALTH SCENARIO, BRAZIL. Vanessa P. Gaioso, School of Nursing, University of Alabama at Birmingham, AL 35294. Silvana M. Mishima, School of Nursing at Ribeirao Preto, University of Sao Paulo, SP 14040-902 (Brazil).

Family Health Strategy has been conducted in Brazil for approximately one decade, assessed by the Health Ministry, which has appointed the need for local studies, mainly in the analysis of the relation between services and their users. The purpose of this study was to assess users' acceptability of the care offered and delivered by Family Health teams in Ribeirão Preto, São Paulo, Brazil. This exploratory-descriptive study was based on a quantitative-qualitative approach method. The sample consisted of 171 users, registered at the four Family Health Units that cover the basic area of a secondary service. The study used semi structured interviews with analytical dimensions: infrastructure, accessibility, and team-user relationships. Descriptive statistics was used for calculations of standard deviation, mean and median, assisted by Statiscal Package for Social Science, and thematic analysis. The results show predomination by the female gender (88%), age older than 60 years old (31%), monthly income inferior to two minimum monthly salaries (34%), and a high satisfaction level in the general assessment. However, in the narratives, was perceived a contradiction, evidenced by users' dissatisfaction with some indicators. Users indicated considerate and affective interpersonal relations as one point of great satisfaction, demonstrating the high valuation of soft technologies in relations between workers and users and one of the aspects that differentiate health care. Dissatisfaction predominated in terms of environment, long time spent in the waiting room and, mainly, obstacles related to organizational accessibility, impairing care longitudinality and continuity. Studies within this theme give opportunities to users, strengthening their participation in the planning processes and exercising social control.

Physics and Mathematics Paper Abstracts

A MATHEMATICAL MODEL FOR OPTIMUM WATER DISTRIBUTION IN A REMOTE CITY WITH A WATER TOWER.

***Arjuna I. Ranasinghe* and Fayequa Majid ,Dept. of Mathematics, Alabama A & M University, Normal, AL 35762.**

A mathematical model will be developed for simulating water distribution in Alabama remote city systems that have water towers. The objective of the proposed model is to optimize water delivery in remote city systems. The inputs to the model include the water source data, distribution facility capacity, delivery site networks, maximum pumping / power requirements, and other constraints. The output will be an optimized network of delivery routes, piping systems, optimum pump / power requirements, efficient delivery rates and use requirements. This will also maintain maximum capacity, lowest power requirements, greatest reliability and shortest down time. We assume that there is a constant pressure at the distribution point where the water tower is situated. The objective functions to be optimized can be any or all of the following: smoothness of operation, lowest power, optimum pumping capacity, reliability, lowest down time, and total cost. Virtually any other efficiency function can be included. In the objective function, practical constraints can also be used including the following: size of available pumps, pipe diameters and lengths, limitations on station capacity, and number of delivery sites (and virtually any others).

A DATING SERVICE PROBLEM: SCHEDULING CONFLICT-FREE PARTIES.

***David Hilgeman**, **Megan Rybolt*, Department of Mathematics, Birmingham-Southern College, Birmingham, AL 35254.**

Birmingham-Southern College requires the completion of a senior project conducted in all major fields prior to graduation. For mathematics majors, the research portion of the project is typically conducted during the month of January. Students choose their problem/focus independently and work closely with an advising professor to eventually complete a final paper and a final project to be presented at the college on Honor's Day. This year's senior math majors were also asked to choose another undergraduate math conference to present their research. Our focus began with the examination of Bryan and Chanyoung Shader's Scheduling Conflict-free Parties for a Dating Service found in the September 1997 edition of The American Mathematical Monthly. The text examines a hypothetical dating service problem in which divorced spouses enroll in the same dating service. The problem solves how to arrange the fewest number of parties where every man and woman meet other than the ex-spouses. For our project we examined their work, proved the unpublished portions, and created a similar problem of our own. Our supporting advisor was Dr. Bernadette Mullins, Associate Professor of Mathematics at Birmingham-Southern College.

A MATHEMATICAL MODEL FOR THE HUMAN CIRCULATORY SYSTEM.

***Bryant K. Allen* and *Cameron H. Daniel*, Department of Mathematics, Birmingham-Southern College, Birmingham, AL 35254.**

The complexities of the human circulatory system are vast. This well integrated system of muscles, the nervous system, the heart, and blood vessels works harmoniously to supply man with oxygen and nutrients while removing dangerous toxins and carbon dioxide. The manner in which the system accomplishes this, thus, is difficult to model. In order to create a model, we must simplify the number of parameters, while still accurately modeling the flow of blood through the human body. Using basic divisions of the vascular system, as well as several physical characteristics of different blood vessels, a mathematical model can be created. Initially, the circulatory system is divided based on two separate characteristics: the location and type of blood vessels the blood is traveling through. Simplifications can then be made on the mechanisms employed by these vessels to control the rate and volume of blood within them. Through the use of these few simplifications, we have created a model that accurately describes the circulatory pressure, volume, and flow of blood within a normal individual. Additionally, manipulation of this model yielded the ability to predict changes in these variables caused by events such as exercise.

A THEORETICAL STUDY OF OPTICAL SPATIAL SOLITON PROPAGATION IN A WAVEGUIDE WITH A REFRACTIVE INDEX PROFILE PERTURBATION.

***Sihon Crutcher*, US Army Research, Development, & Engineering Command, Applied Sensors, Guidance, and Electronics Directorate, Redstone Arsenal, AL 35898. Albert J. Osei, Department of Mathematics and Computer Science, Oakwood University, Huntsville, AL 35896.**

During the last few decades, solitons have been a subject of intense study in almost all areas of physics such as Bose-Einstein condensates, nonlinear optics, plasma physics, and hydrodynamics. Our study is focused on optical spatial solitons. Optical spatial solitons have useful applications for logic devices, optical pulse compression and all optical switching or "light guiding light". We continue a study of the equivalence particle principle applied to an optical spatial soliton which is a "narrow filament" or beam that maintains its existence in a waveguide. Using this principle, expressions for acceleration, spatial frequency, spatial period and other variables for a spatial soliton are derived from the solution of the basic Nonlinear Schrödinger Equation, the equation that describes spatial soliton propagation in a nonlinear media. With a very small refractive index perturbation these results agree well with numerical simulations of the Modified Nonlinear Schrödinger Equation. We show that if the expression of the acceleration is bounded the spatial soliton propagates with a swing effect. We review results of the Gaussian and triangular index profiles and present results for an index profile not previously studied. Finally, our future plans on optical spatial soliton research will be discussed.

ASTROPHYSICAL POINT SOURCE DETECTION VIA LUNAR OCCULTATION.

***Matthew R. Orr* and Richard S. Miller, University of Alabama in Huntsville, Huntsville, AL 35899.**

Nuclear astrophysics (~20-10000 keV) is one of the last electromagnetic regimes without a sensitive all-sky survey, and hence has tremendous potential for future discoveries. A mission dedicated to such a survey will enable studies ranging from a survey of accreting black holes, to probing star formation rates by observing supernovae and novae, as well as investigating the underlying processes that power Active Galactic Nuclei. The Lunar Occultation Observer (LOCO), being developed at the University of Alabama in Huntsville, addresses these goals using the Lunar Occultation Technique (LOT), an innovative approach to an all-sky survey. In this talk I will discuss the capabilities of a detector, such as LOCO, in relation to the detection of astrophysical point sources.

BROWNIAN HEAT ENGINE: A STUDY.

***Ronald Benjamin* and Ryoichi Kawai, Dept. of Physics, University of Alabama at Birmingham, AL 35294.**

Traditional thermodynamics, dealing with systems at the macroscale predicts an upper bound for the efficiency of an ideal heat engine working between two temperatures Tc and Th (Tc < Th):1- Tc/Th, known as the Carnot efficiency. For systems at the micro to nano-scale, where thermal fluctuations play an important role, classical thermodynamics alone cannot account for the observed behavior. We investigate a small-scale Brownian heat engine working between two temperatures Tc and Th, where naively one might expect Carnot efficiency but on rigorous examination is found to be untrue due to the counter-intuitive role of thermal fluctuations. Our microscopic engine can also work as a tiny refrigerator. Both the heat-engine and refrigerator are studied by computer simulation and analytical methods, based on which we present our results.

BULK CRYSTAL GROWTH AND CHARACTERIZATION OF INTENSE SCINTILLATORS FOR MEICAL APPLICATIONS*

R. Hawrami, M.D Aggarwal and A.K. Batra. Department of Physics, Alabama A&M University, Normal, Al 35762.

Advanced Scintillator crystals such as Cerium bromide ($CeBr_3$:3%La), have been grown from melt using Bridgman technique, for X-ray and gamma ray detector applications. Recently halide scintillator materials, such as cerium doped $LaBr_3$ or $LaCl_3$ crystals have proven to be useful materials for the same purpose. But these materials are highly hygroscopic, hard to grow and suffer from the self-activity in these compounds. A search for high resolution, high light yield non-hygroscopic materials are highly desirable to advance the scintillator technology. In this paper, the crystal growth of scintillator materials, Cerium bromide ($CeBr_3$:3%La) has been reported. Crystals were successfully grown from the melt using the vertical Bridgman-Stockbarger technique. In comparison with the high performance Ce-doped $LaBr_3$ or $LaCl_3$ crystals, cerium based halide crystals ($CeBr_3$:3%La), have similar scintillation properties, while being less hygroscopic, high resolution and high light yield,(R~ 8%) and high light yield (67,000 Ph/MeV). However, the CeBr3 crystals cracked while cooling but a few samples for scintillation could be extracted. After sectioning the ingot with a wire saw, the samples were lapped and polished with mineral oil as a lubricant. A Hamamatsu R6427 photomultiplier tube (PMT) was used for recording pulse height spectra with 662 keV gamma rays from a 137Cs source. Preliminary results on the growth and characterization of lanthanum doped cerium bromide crystals shall be presented. * This work was supported under UNCF NAFP research project and NSF HBCU-RISE project HRD-0531183

Detection of Spatially Extended Sources in High Energy Astrophysics with Special Applications to the Lunar Occultation Observer (LOCO).. *Peter A. Jenke*, and Richard S. Miller, University of Alabama, Huntsville. AL 35899.

The Lunar OCcultation Observer (LOCO) is a proposed gamma-ray survey in- strument under development by R.S. Miller (University of Alabama in Huntsville). LOCO is a non-imaging detector that uses lunar occultation to spatially locate sources. Techniques to utilize LOCO to detect spatially extended emission from nu- clear decay and positron annihilation will be developed and explored. Using knowl- edge of both the detector and lunar positions, the typical occultation time series can be spatially binned to form an image, albeit a highly correlated one. Monte-Carlo Markov Chains via the Metropolis-Hatings algorithm for parametric model testing of such image data will explored in depth. The Metropolis-Hatings algorithm has proved to be a valuable tool in parametric model testing where there is either a large number of parameters or the detector response is computationally expensive. The latter is the case here.

DOUBLE PULSE LASER INDUCED BREAKDOWM SPECTROSCOPT IN LIQUID SAMPLES. *Akshaya Kumar* and Prakash C. Sharma, Department of Physics, College of Engineering, Architecture and Physical Sciences, Tuskegee University, Tuskegee, AL 36088.

Laser induced breakdown spectroscopy (LIBS) is a real time online measurement technique of measuring trace elements in liquid, solid and gas samples. Double pulse LIBS is a technique in which two laser beams are used to ablate the sample. The first laser pulse creates the plasma plume of the sample and second laser pulse that arrives at few μs time delay re-ablates the plasma plume created by the first laser pulse. The spectrum of the plume created by laser beam is recorded using spectrometer. Both single pulse and double pulse LIBS of water containing trace elements has been performed. Limit of detection obtained by double pulse LIBS technique has been compared with the single pulse LIBS technique. In double pulse LIBS the time delay between two laser beams has been optimized to obtain maximum enhancement in the signal. It has been observed that double pulse LIBS is more beneficial than single pulse because it gives better limit of detection for the trace elements dissolved in water. Keyword: Laser Induced Breakdown Spectroscopy.

ESTIMATING THE AVERAGE EXOSPHERIC TEMPERATURE. ***Arjun Tan*****, Vin Bhatnagar, Tianxi Zhang, and Sonya Lyatskaya, Dept. of Physics, Ala. A&M Univ., Normal, AL 35762.**

The exospheric temperature is a parameter of utmost importance on which the neutral densities in the upper atmosphere depend. Historical estimates of the average exospheric temperature range from a high of 1500K to a low of below 1000K. These estimates betray a declining trend in general. In this study, it is assumed that the average exospheric temperature represents a steady-state condition governed by the time-independent thermal diffusion equation in the vertical dimension. By comparing the model temperature profiles thus obtained with the observed profiles, the average exospheric temperature is estimated to be 1150K. This is close to the geometric mean of the extreme exospheric temperatures (traditionally taken as 2000K and 600K) of 1095K. The average F10.7 solar flux index of the past 60 years of observation of 131.01 yields an average exospheric temperature of 1000K from empirical considerations. The average geomagnetic ap index over the same period of 15 contributes to the global exospheric temperature enhancement of 41.7K. The implications of possible cooling of the exosphere by greenhouse gas emissions is discussed.

HIGH SPEED PHOTOGRAPHY IN SHOCK WAVE PLASMA DYNAMICS. ***Aaron C LoCascio*****, Nirmol K Podder, and Anastasia V Tarasova, Department of Math and Physics, Troy University, Troy, AL 36082.**

A high speed imaging camera is used to capture the dynamics of a propagating shock wave in the glow discharge nitrogen and argon plasmas for both anode-to-cathode and cathode-to-anode propagations. Video frames obtained for the shock wave propagation in the nitrogen plasma indicate that the plasma emissions at the nitrogen shock-front are enhanced, whereas those in the argon plasma indicate that the plasma emissions at the argon shock-front are quenched. The shock-front in the nitrogen plasma is observed to carry along a compressed bright structure, whereas the shock-front in the argon plasma has been preceded by a dark region. Analyses of the video frames yield the shock wave propagation velocities, which are compared with the velocities obtained from a laser beam deflection method.

MULTIVARIATE STATISTICAL ANALYSIS OF CRIME RATE IN ALABAMA COUNTIES. ***Brittany M. Allison*, *Kelsey H. Jordan*, and *Mallory B. Morring*****, Mathematics undergraduate students of Birmingham-Southern College, Birmingham, AL 35254.**

In this mathematical study, we create a model to predict the crime rate for each of the sixty-seven counties of Alabama. Our methods include univariate scatterplots, multivariate residual plots, and partial regression plots. Initially, we consider thirteen predictor variables, but then narrow to the three variables that have the most impact on predicting the crime rate. The model is reasonably accurate and so will help Alabama residents gain a better perspective on the influence of crime rate in their respective counties. Lastly, we test the reliability of the Alabama model on appropriate data for additional states.

OPTICAL SPECTROSCOPY AND DEVICE FABRICATION OF WIDE BAND GAP SEMICONDUCTORS. ***Minseo Park*, An-jen Cheng, and Hui Xu, Dept. of Physics, Auburn Univ., Auburn, AL 36849. Dake Wang, Dept. of Physics., Furman University, Greenville, SC 29613. Yi Zhou, Dept. of Electrical & Comp. Engr., University of California, Los Angeles, CA 90095.**

Wide band gap semiconductors such as GaN and ZnO are interesting materials because of their promising application in electronics and photonics. In our laboratory, we have been carrying out research on GaN and ZnO with emphasis on optical characterization and device fabrication. We have synthesized nanostructures of ZnO using a thermal chemical vapor deposition, and nanostructures with a variety of morphologies have been produced. Photovoltaic properties of ZnO nanostructure-based dye-sensitized solar cells (DSSCs) are also being investigated. We have studied optical properties of semiconducting nanostructures using Raman spectroscopy and photoluminescence spectroscopy. Raman spectroscopy is a non-contact method to study electronic properties of semiconductors. The electron concentration and electron mobility of the MBE-grown GaN nanorods were determined by the line shape analysis of the coupled LO phonon-plasmon mode. A vertical Schottky diode rectifier was fabricated using a bulk n--GaN wafer. Schottky and ohmic contacts were prepared on the Ga- and N-faces using Pt and Ti/Al, respectively. The device exhibited ultra-fast reverse recovery characteristics (reverse recovery time < 20ns). Schottky-type "visible-blind" UV photodetector was also fabricated and its device characteristics were investigated. The device exhibits ultra-low dark current density (@10V reverse bias) of ~0.8nA/cm^2 and an excellent UV/visible selectivity of 10^6.

PLASMA EFFECTS ON PROPAGATING SHOCK WAVES. ***Nirmol K. Podder*, Aaron C. LoCascio, and Jonathon T. Simmons, Troy University, Troy, AL 36082.**

Shock wave propagation dynamics are recorded by a high speed camera and the shock properties are measured by a laser beam deflection technique. Steady-state plasma measurements show that the shock wave velocity in plasma rises linearly with the plasma discharge current. The time-dependent measurements after the plasma switch-on and switch-off indicate that the observed changes in the shock wave structure and velocity are primarily caused by the temperature variations in the glow discharge plasma. The observed shock wave modifications by plasmas have potentials for improving supersonic flight characteristics by providing a means for reducing drag forces on the supersonic vehicle.

STATISTICAL ANALYSIS OF HEARTWORM INCIDENCE IN URBAN AND RURAL ALABAMA.

Megan Green, **Jan Case, Jacksonville State University MCIS Department, Jacksonville, AL 36265.**

Heartworm disease is a deadly parasitic infection of canines caused by the nematode Dirofilaria immitis. In 2004, there were more than 250,000 cases diagnosed in the United States of which almost 15,000 were in Alabama. Heartworm disease is found in both northern and southern temperate zones, as well as in the tropics and subtropics. The Southeast and the Mississippi River Valley have the highest incidence of heartworm in the U.S. with infection rates approaching 45% in some endemic areas. This study explored the monthly incidence rate of heartworm disease based on medical records from two veterinary clinics in north Alabama. Data was examined for seasonality and overall trend over time in an urban area with population exceeding 45,000 as well as in an agricultural setting. A two population t-test was conducted to examine differences in the two areas and ANOVA was used to test for differences in incidence rates for fall, spring, summer, and winter. A trend analysis was performed to describe the upward drift in mean monthly incidence rates over ten years for the urban area.

THE HYPERBOLIC NUMBER PLANE.

Jared Ballinger and *Ryan Henry*,**Birmingham-Southern College, Birmingham, AL 35254.**

The Hyperbolic number plane is useful in both mathematics study and physics. After studying its properties and techniques, its philosophy can be used to describe such topics as special relativity and solving the cubic equation. Using the work of Garret Sobczyk and others, Ryan Henry and Jared Ballinger take a study of Hyperbolic numbers and explore their uses in the topic of special relativity. With support from Dr. Bernadette Mullins, a professor of Mathematics at Birmingham-Southern College, Jared and Ryan use their knowledge of complex numbers to describe the hyperbolic number plane.

THE PYROELECTRIC PROPERTIES OF LiTaO3:P(VDF-TrFE) COMPOSITES.

Kazuto Miura*, R. Hawrami, A. K. Batra, M. D. Aggarwal, and R. B. Lal, Department of Physics, PO Box 1268,Alabama A&M University, Normal, AL 35762.

Films of lithium tantalate (LT):polyvinylidene fluoride-trifluoroethylene [P(VDF-TrFE)] composite have been prepared by 'solvent-cast' (SC) method with various wt% of LT powder. The dielectric constant, dielectric loss and pyroelectric coefficient have been measured as a function of temperature. In addition, material figure-of-merits have also been calculated. The results show that this kind of composite material has a good potential for use in flexible pyroelectric infrared sensors.

TIGHTNESS OF SEQUENCES OF RANDOM COMPACT SETS IN POLISH SPACES. ***Hussain Elalaoui-Talibi*****, Tuskegee University, Tuskegee, AL 36088, and Lisa Peterson, Auburn University, Auburn, AL 36849.**

Let X1, X2,... be a sequence of random compact sets on a Polish space S. Assume that the hitting probabilities P(XnB) converge to the hitting probability P(XB) of a random compact set X in S for all sets B in a suitable class of subsets of S. We prove that under the Hausdorff topology, the sequence X1, X2,... is tight.

TRIBOLUMINESCENT MATERIALS FOR LUNAR HABITATS ***Sandra Sadate*****, Rastgo Hawrami, Kamala Bhat and M.D. Aggarwal, Department of Physics, Alabama A&M University, Normal, AL 35762**

Triboluminescence is the phenomenon that produces light by pressure, friction or mechanical shock. New composite materials are constantly being reengineered in an effort to make lightweight spacecrafts for various NASA missions. For these materials there is interest in monitoring the condition of the composite in real time to detect any delamination or cracking due to damage, fatigue or external forces. Recently, triboluminnescent materials have been proposed as smart sensors of structural damage. To sense the damage, these materials can be epoxy bonded or coated in a polymer matrix or embedded in a composite host structure. In the present paper, synthesis of a triboluminescent material is given that shows intense triboluminescent properties. The reaction of anhydrous europium chloride with dibenzoylmethane and triethylamine in ethyl alcohol gave a successful synthesis of europium based organic complex. Under Ultraviolet light, Europium gives an intense orange red glow. The material is tested in a dark room where after few minutes of eye conditioning in the dark, it is crushed and triboluminescence is observed. Modified and more efficient triboluminescent materials are yet to be identified for the making of paint for eventual use in lunar habitats. * This work was supported under UNCF NASA Administrator's Fellowship Program research project and NSF HBCU-RISE project HRD-0531183

USE OF TECHNOLOGY IN ENHACING CALCULUS TEACHING: CASE STUDIES. Fayequa B. Majid, Ph.D., and Arjuna I. Ranasinghe, Ph.D. Alabama A & M University, Department of Mathematics, P.O. Box 326, Normal, AL 35762.

In order to improve learning outcome of calculus students, technology has been used in classrooms for last two decades. Research shows that technology integrated intelligently produces measurable learning outcomes. There is substantial evidence that Computer Algebra System (CAS) used for symbolic calculations lead to conceptual understanding. Due to the exploratory nature of the CAS system, students develop a better understanding of basic concepts. Research points out how use of inappropriate technology lead to incorrect solution. In this paper, we have demonstrated how use of graphic calculator lead to incorrect conclusion. In contrast, due to increased resolution of Maple, graphs can be displayed with increased clarity and the conclusion could be less ambiguous. The interactive nature and the fast computational ability of CAS using Maple also reveal some hidden features.

WAVE EQUATION AS EQUIVALENT LAPLACE'S EQUATION IN A HIGHER DIMENSION. *Arjun Tan*, Fayequa Majid, and Matthew Edwards, Dept. of Physics, Ala. A&M Univ., Normal, AL 35762

It is shown that the wave equation is equivalent to a Laplace's equation in a higher dimension when an appropriate coordinate system is chosen in which an uncoupled coordinate is converted into time. For a one-dimensional wave equation, the Cartesian coordinate (x, y) is chosen where x is the direction of propagation and y is equivalent to time. For a two-dimensional wave in the x-y plane, the cylindrical coordinate system ([illegible], [illegible], z) is an appropriate coordinate system when z translates into the temporal coordinate. In three-dimensional space, the wave equation is equivalent to a generalized Laplace's equation in four dimensions. In the particular solutions to the wave equations in two and three dimensions, the energy density of the wave is inversely proportional to the distance and the square of the distance, respectively, from the source of the wave. The effects of the 2004 Sumatra Tsunami are discussed based on these studies.

WHISPERING-GALLERY-MODE RESONANCES IN FLUORESCENT MICROSPHERES. *Mary E. Williams*, D. Brian Thompson, Univ. of North Alabama, Florence, AL 35632.

We are collecting emission spectra from fluorescent microspheres, aligned to form coupled cavities. A single fluorescent microsphere can act as a Fabry-Perot resonance cavity, so that it will exhibit morphology-dependent resonances (MDRs), also known as whispering-gallery-mode (WGM) resonances, as intense narrow peaks superimposed upon the free-space fluorescence emission background. Two or more microspheres in close proximity may form a coupled cavity, where the coupling arises from evanescent fields between the microspheres. The coupling strength then should be a strong function of separation distance between spheres. We use an optical tweezers to position the microspheres, to guide the excitation light, and to collect the emission from the microspheres for spectral analysis. The goal of these measurements is to examine the behavior of MDRs in the emission spectra of two coupled microspheres as separation distance is varied. However, at this stage in our work, we are examining how various fluorescent dye-staining methods affect the spectra we collect. This research is funded by a Cottrell College Science Award from Research Corporation.

Physics and Mathematics Posters Abstracts

CALCULATION OF NUMBER OF FREE AND BOUND ELECTRONS IN DOPED SEMICONDUCTORS IN INTERMEDIATE CONCENTRATION REGION.

***Akshaya Kumar* and P.C. Sharma, Department of Physics, College of Engineering, Architecture and Physical Sciences, Tuskegee University, Tuskegee, AL 36088.**

Using the inhomogeneity model, the number of electrons in the bound and conduction band regions are calculated. The electron (hole)-phonon interaction in doped semiconductors has so far been divided into two categories, depending upon the doping concentration. When the impurity concentration is low, the electrons or holes are bound to the impurity atoms and the theory of bound electron (hole)-phonon scattering is used to explain the phonon conductivity values of the samples with low doping. For high impurity concentration, when the impurity level merges with the conduction or valence band, the free electron (hole)-phonon scattering theory explains the conductivity values of a number of doped semiconductors. However, the phonon conductivity values of a number of doped semiconductors with impurity concentrations lying in the region corresponding to the transition from bound or nonmetallic state to free or metallic state, remain unexplained and no study has been made of the electron (hole)-phonon scattering in the transition region. In the present work, we study the impurity states of doped semiconductors in intermediate concentration region. Using the inhomogeneity model, the number of electrons in the bound and conduction band regions are calculated.

DEVELOPMENT OF ADVANCED SCINTILLATOR READOUT TECHNOLOGY FOR HIGH-ENERGY ASTROPHYSICS.

***J. Michael Burgess* and Richard S. Miller, Dept. of Physics, Univ. of Ala. in Huntsville. Huntsville, AL 35899.**

The field of nuclear astrophysics provides a unique window into some of the most complex astrophysical processes in our Universe. To continue the tradition of scientific discovery in this field, more proficient and echnologically-advanced space-based □-ray observatories must be designed and flown. This goal comes at the price of increasingly more massive, expensive, and complex missions. The purpose of this work is to develop and evaluate a new technology that, when coupled with newly developed materials and previously unused techniques, will aid in increasing the viability of future space-based □-ray missions while simultaneously reducing the mass,cost, and complexity of those missions. This technology has the potential to revolutionize instrumentation in high-energy astrophysics as well as further NASA's pursuit of science at the cosmic frontier.

EFFECT OF GLASS HOST ON OPTICAL PROPERTIES OF Gd 3+ IONS DOPED IN OXYFLUOROBORATE GLASS. ***Akshaya Kumar*, Erika N Nelums, and Prakash C Sharma,Department of Physics Tuskegee University, Tuskegee, AL 36088.**

Gd^{3+} ions doped oxyfluoroborate glass was excited using excimer laser 308 nm (32458 cm^{-1}) radiation. A deep red orange fluorescence was observed from the Gd^{3+}doped glass. Gd^{3+}ion has ground energy state 8S7/2 and first exited energy state is ${}^6P_{7/2}$ lies about 32186 cm^{-1} above the ground state. The deep red orange fluorescence has been explained by two photon absorption followed by emission from the higher excited energy states in UV and VUV region. Life time of ${}^6P_{7/2}$ energy state has been measured. The effect of vibrational frequency of glass forming chain BO_3 and BO_4 on fluorescence from ${}^6P_{7/2}$ to ground state ${}^8S_{7/2}$ has been observed.

OPTICAL PROPERTIES OF Eu3+ IONS DOPED GLASSES. ***Zachary A. Whitfield*, Akshaya Kumar, and Prakash C. Sharma, Department of Physics, College of Engineering, Architecture and Physical Sciences, Tuskegee University, Tuskegee, AL 36088.**

The transition from excited energy state ${}^5D_0$ to lower energy state ${}^7F_2$, of Eu^{3+} ion, emits radiation in the red-orange region of electromagnetic spectrum. This transition is well known for its application as red color phosphor in television display and for developing lasers. When Eu^{3+} ions are doped in a solid matrix, like glass or crystal, the emission parameters such as intensity, life-time and band width of this transition is being affected. A comparative study of the effect of glass host on optical properties of Eu3+ ions has been made. The fluorescence spectrum of Eu^{3+} ions doped in tellurium niobate glass has been recorded using ocean optics QE 65000 spectrometer. Peak assignment of energy levels has been performed. Keyword: Optical properties.

QUANTUM TUNNELING AND TUNNELING CURRENT. ***Akshaya Kumar* and P.C. Sharma, Department of Physics, College of Engineering, Architecture and Physical Sciences, Tuskegee University, Tuskegee, AL 36088.**

The phenomenon of quantum tunneling influences the tunneling current: Theoretical calculation in low and intermediate voltage range is main theme of this presentation. The "Electron Current Density Vs. Voltage" at different film thickness and barrier heights is presented. The interaction between conduction electrons and a localized 2-level-system caused by a defect is analyzed in the present work.

SUPERCONDUCTIVITY AND APPLICATION TO MODERN SCIENCE WORLD. ***Akshaya Kumar* and P.C. Sharma, Department of Physics, College of Engineering, Architecture and Physical Sciences, Tuskegee University, Tuskegee, AL 36088..**

The phenomenon of superconductivity is discussed in this presentation. Properties and the BCS theory of Superconductors are discussed. The comparison between the high temperature superconductors with classical superconductors is presented. Structural features of High Temperature Superconductors and temperature versus electron and hole doping phase diagrams are presented in this work.

Science Education Paper Abstract

INTERACTIVE TECHNOLOGY OF CLASSROOM COMMUNICATION SYSTEMS AS AN APPROACH TO ACTIVELY ENGAGE SCIENCE STUDENTS AND ASSESS LEARNING IN THE SCIENCE CLASSROOM. ***Nicholas Daniel*****, Luverne HS, Luverne, AL., Marian J. Parker, Dept. Curriculum & Teaching, and Janet L. Gaston, Dept. Biological & Environmental Sciences, Troy University, Troy, AL 36082.**

Teaching with the aid of technology such as power point presentations and video clips have become an enhancing part of the science instructor's lesson plan in the university and college classrooms as well as in the secondary teacher's classrooms. In attempts to actively engage students in classroom discussions, motivate attendance, and provide instance feedback, some instructors and high school teachers have taken classroom technology to another level and have introduced the classroom communication system ("clickers") to their students as an immediate feedback response system. A variety of options for the "clickers" have been used such as verbal and written quizzes, tests, attendance-taking, and games. As an approach to engage his students, a science teacher at Luverne High School, Luverne, Alabama, has used the "clickers" in his classes. Based on his experiences, this technology offers a variety advantages for the teacher and the student and as with anything in the classroom that has an upside, the technology presents challenges as well.

NANOTECHNOLOGY AND ETHICS IN GENERAL EDUCATION COLLEGE COURSES. ***Michelle Sidler, Dept. of English and James Bradley*****, Dept. of Biological Sciences, Auburn University, Auburn, AL 36849.**

Funded by an NSF Nanotechnology Undergraduate Education Grant, an interdisciplinary team of science, engineering, and liberal arts professors from three universities recently developed an undergraduate course and other curricular enhancements on nanotechnology and its ethical, social, and legal implications. The collaboration, which included faculty from Auburn University, Auburn University-Montgomery, and Tuskegee University, yielded several A semester-long general education science course, nanotechnology modules in existing world history courses, a summer session on nanotechnology for entering minority science majors, and a faculty development program in the subject. Here, we argue the importance of teaching non-scientists about nanotechnology and its potential positive and negative impacts for health, electronics, and consumer products. In addition to the science of nanotechnology, the curriculum innovations emphasize ethical reasoning and critical analysis designed to help students negotiate future advances. This presentation provides an overview of the curricular innovations in nanotechnology and offers suggestions for implementing similar programs at other institutions.

SO, YOU'RE A SCIENCE MAJOR? THEN, ACT LIKE ONE: SOME EXPERIENCES IN DEVELOPING A SCIENTIFIC METHOD CURRICULUM.

Brian S. Burnes, Department of Biology, Judson College, Marion, AL 36756.

Science curricula are expected to produce students with some balance of both factual knowledge and and scientific "ability", which includes a variety of skills such as critical thinking, application of the scientific method, problem-solving, and evaluation and analysis of information. Some recent experiences in developing a more effective science curriculum are reported along with results of student and instructor evaluations of classroom and laboratory exercises. Although it is expected that introductory-level courses require structured activities and advanced courses can benefit from more open inquiry, the individual student is always an issue.

TEACHING MODULE IN SEA TURTLE GENETICS: SEA TURTLE CSI

***Jennifer Estes* and Thane Wibbels, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.**

A teaching module was developed for high school level students based on sea turtle conservation and genetics. This module is targeted to teach students concepts of wildlife conservation and management through the application of state-of-the-art genetic techniques. Students are initially given a series of multimedia presentations to provide a background in sea turtle biology, conservation, and molecular genetics. The module is designed as a portable experiment that can be conducted in the classroom. Students are given a scenario in which they are wildlife conservation agents in charge of identifying sea turtle tissue samples that have been confiscated by customs officials. Students are assigned unknown samples of loggerhead DNA. Their goal is to identify the haplotype (and potential origin) of their unknown sample via PCR, gel electrophoresis, and DNA sequencing. The goal of the module is to give the students a basic understanding of molecular biology and its applications to conservation. This module is currently being implemented for high school students in the Birmingham area through the UAB Center for Community Outreach Development (CORD).

THE USE OF A STUDENT RESPONSE SYSTEM FOR TEACHING GENERAL BIOLOGY *James R. Rayburn* Department of Biology, Jacksonville State University, Jacksonville, AL 36265.

In seeking to improve teaching of Biology classes at the freshman level I have incorporated many methods including, inquiry based methods, PowerPoint and audio visual aids in the class room. As part of an assessment of General biology 101 class I included the use a new method using a Student Response System which allowed me to get real time feed back during my classes. The "Turning point" software used worked within power point as a tool bar and was easy to incorporate in to PowerPoint lectures. The system provides some very useful information however there is some cost involved. The system does require the students buy a response device. The instructor must incorporate the student ID numbers with individual response device ID numbers if you wish to track individual students. One of the purposes was to take attendance using the response device to eliminate the time consuming alternative of taking roll. During setup period there is learning curve and difficulties that must surmounted. Overall the student's response to the system was positive after the initial cost of the response devices. This method proved an excellent method for giving real time pop quizzes in class and providing an avenue for discussion in the class room. Students enjoyed the question and immediate answers during the class. Overall the method is useful and for teachers using PowerPoint lectures it is easy to incorporate into the classroom.

Aladdin: the UAB Alice, Linear Algebra, Dynamic Dimensional Information Network for High School Students. *J. Michael Wyss* Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.

Aladdin is a Youth Based Project aimed at increasing math and computer competancy among minority and underserved youth (about 120 high school students per year). The program links together the Center for Community OutReach Development (CORD) and four UAB Schools, and also leverages the newly developed Interactive Digital Center [IDC]. Most of the students in these districts will have lost interest in math and IT by the time they reach grade 11. The proposed program engages them early through easy hands-on imaging programs that resemble the video games many of them love. By sequentially introducing them to the math and IT foundation for such programming, it will prepare high school students to be leaders in information technology in their high schools, undergraduate and graduate studies and careers. The students begin with a week-long "Alice Film Festival" discovery experience during the summer prior to their sophomore year. During the subsequent school year, the students participate in an after-school, inquiry-based experience, "Mathematizing Alice's World." This experience will help the students understand the math behind visual imaging and they will learn to use C language. The summer of their rising junior year, students engage in a weeklong experience "Robot C," in which they will learn to program robots in several tasks using Lego Mindstorm. During the junior school year, each team of students design and complete a project at the IDC facility one night per week after school, under the mentorship of a UAB facilitators, area teachers and parents. Each team of three students will write a program to accomplish their project's goal, typically using advance 3-D imaging, rotation in all axes and the ability to accurately calculate dimensional and temporal parameters, i.e., develop component codes to visualize Computational Fluid Dynamics (CFD) and Computational Structural Mechanics (CSM) simulations of flow over vehicles or stress distribution during bone fracture. The project will have broad impact 1) by increasing the participation of underrepresented groups in IT, and provide role models of successful IT-related scholars in the underserved schools, 2) through the creation of a long-term sustainable IT-training program and 3) through the development and dissemination of the programs in math and IT to other schools and teachers in the US .

Science Education Posters Abstract

INTEGRATED LEARNING: FIRST-YEAR READING INITIATIVE AND PRINCIPLES OF BIOLOGY. ***Michael Wayne Morris*****, Rachael N. Koigi, and Christi Magrath, Department of Biological and Environmental Sciences, Troy University, Troy, AL 36082.**

During the Fall Semester, 2007, the Troy Campus of Troy University began a First-Year Reading Initiative to foster integrated learning among entering freshmen. One of the goals of this reading initiative is to promote a variety of perspectives reflecting each discipline involved on a common literary work. This, in turn, is meant to sharpen the analytical skills of first-year students at Troy University and to remind them that different college subjects are connected. Seemingly unrelated subjects can be integrated for a holistic approach to learning. To help accomplish this, a faculty committee chose a national bestseller about a post-apocalypse, The *Road* by Cormac McCarthy, to incorporate into English, art, history, university orientation, and biology classes. Department of Biological and Environmental Sciences faculty teaching Principles of Biology had the challenge of finding life in a lifeless world as described by McCarthy and sharing that discovery with their students. Biology faculty drafted questions, some of which required the students to do some research outside of class, related to *The Road* and also related to topics such as ecology, health, and biological chemistry that are traditionally taught in life science courses, and included five of these questions on final exams. Experiences of biology faculty and students conducting this exercise will be presented.

Gorgas Competition Posters Abstracts

Chemistry of the Black Sea: The Role of Manganese in the Separation of Hydrogen Sulfide from Oxygen. *Kirstin Sockwell*, Jefferson County International Baccalaureate School. 6100 Old Leeds Road, Birmingham, AL 35210.

Research conducted by Dr. George Luther and colleagues has shown manganese ions acting as natural barriers between the large amount of poisonous hydrogen sulfide and the oxygen of the Black Sea. Three zones are maintained in the water: the oxic, suboxic, and anoxic levels. The oxygen is only found in the top layer, the oxic zone while the hydrogen sulfide is concentrated mostly in the bottom layer, the anoxic zone. The hydrogen sulfide and oxygen are kept separate through a series of redox reactions. Manganese is believed to play a crucial role in this separation. A mock sea was set up in an attempt to show the formation of the three levels. Due to the lack of pure chemicals and a limited understanding of the process, the experiment failed to recreate the desired process. However, the experiment led to an extension of the original investigation focusing on reactions of potassium permanganate and manganese dioxide when mixed with sodium sulfide. Mixed in water, potassium permanganate and sodium sulfide produced observable layers of varying colors. The layers support the conclusion that manganese may in fact play a key role in separating oxygen and hydrogen sulfide in the Black Sea. Understanding the complex system of manganese's role in filtering toxins such as hydrogen sulfide which was tested in this investigation and explained by Dr. Luther's research could lead to new techniques for purifying water.

Effects of Renewable Gasoline Extenders on Fuel Line. Melissa R. Snow, Patrician Academy, Butler, AL 36904.

This project is to determine the effect renewable gasoline extenders have on the flexibility of fuel line in an engine. It is hypothesized that the methanol, ethanol, and turpentine mixtures will adversely affect the flexibility of the fuel line. First test sample racks were constructed. Then the tester must be built. Cut 120 pieces of tubing for the test samples. Place the tubing on the tester and insert the plug/ pointer into the open end of the sample.

Then, place pennies and quarters into the cup until the test sample deflects thirty degrees. Record the number of coins used, and calculate the weight. Repeat the test for all other samples three times each, and record data. The overall average weight for the control was 108.43 grams. For the 100% Canola Oil it was 108.84 grams. For 10% Canola Oil/ Gasoline, it was 84.68 grams. For 100% Castor Oil the total average was 126.48 grams. For 15% Castor Oil/ Gasoline it was 81.86 grams. For 100% Ethanol it was 95.84 grams. For 50% Ethanol/ Gasoline the total average was 70.69 grams. For 100% Gasoline it was 93.21 grams. For 100% Methanol the total average was 102.28 grams. For 50% Methanol/ Gasoline it was 70.01 grams. 100% Turpentine's average weight was 61.97 grams. For 50% Turpentine/ Gasoline it was 69.70 grams. The results of this project supported the hypothesis in that the methanol, ethanol, and turpentine mixtures did in fact adversely affect the flexibility of fuel line.

IMPACT OF ROOT SYSTEMS FOR MITIGATING SLUMP. ***Charlotte Mae C. Kent.*** **Shades Mountain Independent Church Academy, Birmingham, AL.35226-1701.**

A slump occurs when a section of sediment on a slope collapses and falls with gravity. Sometimes the soil rotates during its descent; other times it just descends down the slope. For example, along the Red River in North Dakota slumps occur frequently because of construction, clay-rich soil and demolition of trees along the riverbank. Are the slumps a result of the lack of root systems? Clay-rich soil is also found along Turkey Creek in Pinson Alabama. To conduct the experiment, one needs to obtain two types of soil samples: one with foliage (indicating an established root system) and one without any plants. The slump incident is replicated by recreating the slope of the samples in a clear container (rectangular prism) and by simulating a rainfall. By measuring the amount of slump, the amount of yield stress can be determined allowing for the prediction of the amount of mechanical reinforcement which root systems provide. Through hypothesis testing, the difference in the average slumps of the dirt with and without root systems is proven statistically significant. The null hypothesis was equivalent to the sample (rootless) average of slump which was 42.18 millimeters. The alternate hypothesis stated the population (foliage) average of slump would be less than the sample average of slump and was 15.50 millimeters. The conclusions of the experiment support the claim root systems alleviate the amount of slump along clay-rich creek banks. The average slump of the soil without the root system was almost two and half times that of the soil with foliage. Also, the average yield stress of the soil sample with foliage was approximately 110 Pa greater, meaning the soil with the root systems was stronger than the sample without. This experiment also suggests plants which could be cultivated along the Red River bank in North Dakota to lessen the amount of slump.

Magnetic Nanoparticles for Hyperthermia Treatment of Cancer, ***Christopher Dean Romanczuk*****, Randolph School, Huntsville, AL 35802.**

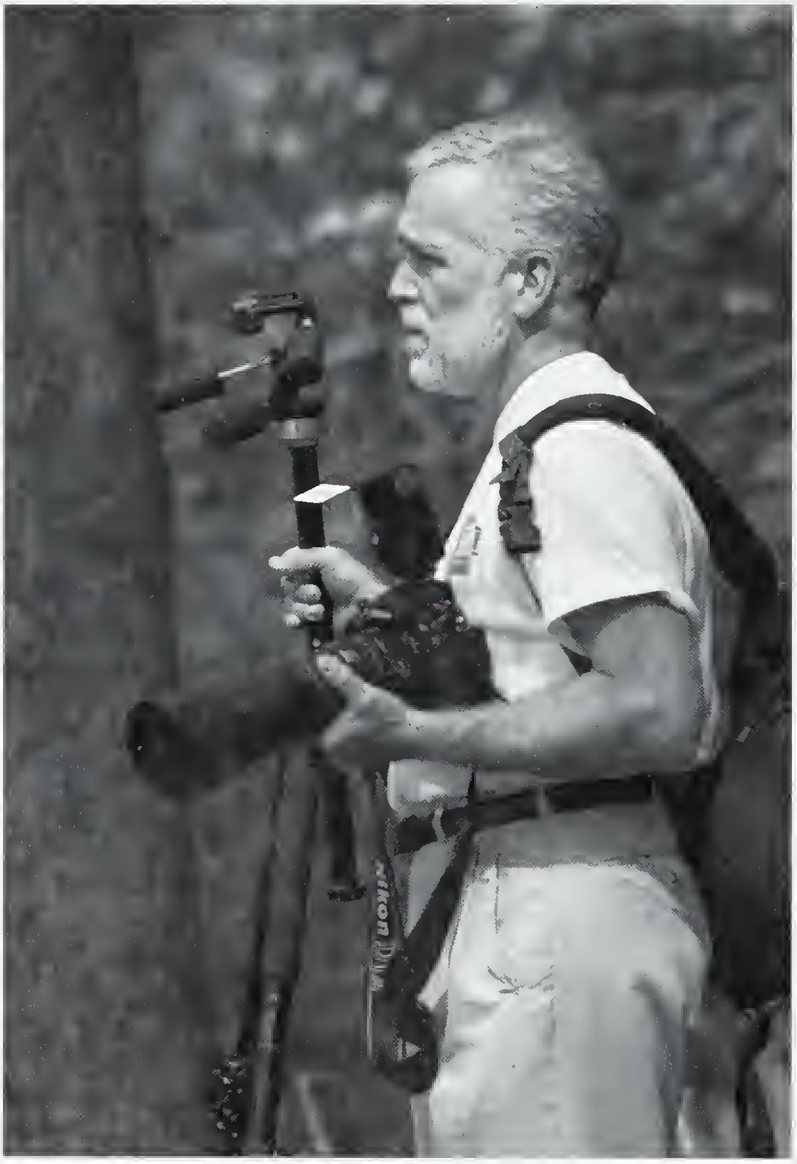
A series of magnetic alloy nanoparticles was evaluated for use in magnetic fluid hyperthermia therapy for cancer treatment. The primary objective of this project was to develop magnetic nanoparticles with material properties which would allow them to be heated to an acceptable temperature when excited by a radio frequency alternating magnetic field. This paper presents the results from my study of FePt, Fe3Pt and FePt3 particles, as well as some work developing CuNi particles. Nanoparticles were synthesized chemically, characterized, and tested for their magnetic properties and potential for hyperthermia treatment. The maximum final temperatures attained in the hyperthermia chamber were as follows (in Degrees C): FePt 40.2,FePt3 37.3,Fe3Pt 44.5 and FePt annealed 42.5. The specific absorption rate (SAR) values attained in the hyperthermia chamber were as follows (in Watts per gram): FePt 22.4,FePt3 19.1,Fe3Pt 14.7 and FePt annealed 20.4. These values provide a baseline for comparison with other particles. The results also showed that treatment of cancer cells is possible with these particles which achieved a high enough temperature to destroy cancerous cells when placed in close proximity and excited by an alternating magnetic field. The author was a Nanoscience and Engineering High School Research Intern in the laboratories of David E. Nikles at the University of Alabama. His internship was supported in part by the NSF Materials Research Science and Engineering Center award DMR 02-13985.

SPREAD OF THE RESIDENT CANADA GOOSE (BRANTA CANADENSIS) TO NEW TERRITORY. ***Daniel C. Wilson*****, Shades Mountain Independent Church Academy, Birmingham, AL.35226-1701.**

This project seeks to answer the question, "Does a single primary breeding pair of resident Canada geese return annually to the same nesting grounds with previous offspring to establish a seasonal colony?" Using six years of data collected, this project retrospectively analyses the behavior of a flock of resident Canada geese, focusing on the population of an area by a single pair of geese. At the conclusion of the study, practical applications were found for the behavioral observations. These applications center around timing for the removal of geese when they are in conflict with humans, offering both a prescriptive solution for large flocks of established problem geese, as well as a preventative solution for those seeking to avoid future potential for conflict. The study raises a question for future study, keying in on the behavioral observation of "caretaker" geese that was documented in the course of the study. The topic of "caretaker" geese seems to be under-researched by scholarly undertakings, and thus the preliminary findings of this study on this topic require further research. The relationship between different families of geese could prove valuable in understanding the family and social structure more fully. This would take further study to understand, but might yield unforeseen applications.

In Memoriam
Ronald Lee Jenkins, Ph. D.

Samford professor of biology, Dr. Ronald Lee Jenkins, passed away on April 27, 2007, at age 54. "Dr. J" had taught at Samford for the past nineteen years. *The Samford Crimson*, issue of May 2, 2007, reported: "The admired professor will always be remembered as an avid outdoorsman who had a passion for the wonder of life and a deep respect for nature. He worked hard to protect wild areas in the state, cleaning up rivers and preserving native species."



W. Mike Howell, retired professor of biology, collaborated with Jenkins on *Spiders of the Eastern United States: A Photographic Guide.* Howell and Jenkins were co-teachers of field zoology courses for several years. The two professors designed a method of teaching zoology that used photography of live specimens with online field guides to supplant the older method of killing and preserving specimens. Jenkins was known as a believer in the reverence of life and felt that nature was given to man to protect. His belief in the sanctity of life for even the smallest creatures led to a favorite saying, "Spiders are people, too!" Quoted by the *Birmingham News* (issue of May 1, 2007), Howell remarked that Dr.Jenkins was "energetic, enthusiastic . . . he was the consummate teacher. He was like a pied piper, leading students around the environment. He loved nature and had a passion for things wild."

Jenkins was a dedicated scientist and teacher who was generous with his time and energy in encouraging students to pursue research, to appreciate nature, and to explore options in careers in biology. He loved what he did - being a part of a classroom and sharing his passion for the natural world as teacher and mentor. His teaching history included classes in science and religion, physiology, zoology, anatomy, cell and molecular biology, and environmental ethics and values.

Dr. Jenkins earned a bachelor's degree in biology from Carson-Newman College in Tennessee and was chosen as Alumni of the Year in 2004. In addition, he earned an M.S. in zoology and Ph.D. in physiology from Auburn University. He worked several years at the University of Alabama at Birmingham doing research in diabetes. His work on identifying steroids and hormones as environmental pollutants brought international recognition. Dr. David Chapman, Dean of the Samford's Howard College of Arts and Sciences, mentioned that "he was an outstanding researcher who brought to light the effect of paper mill effluent on various fish species. He was once escorted off a paper mill property when he was found taking samples at a settling pond."

In addition to his outstanding research, Jenkins assisted with the development of the new Interpretive Center at Oak Mountain State Park. Chapman explained that Jenkins "worked hard to protect wild areas in the state, cleaning up rivers, and preserving native species." He helped create a butterfly preserve along Shades Creek near the university. Jenkins was also instrumental in effecting the design for Samford's state-of-the-art Sciencenter, which was completed in 2001. This impressive facility houses the Departments of Chemistry, Physics, and Biological and Environmental Sciences.

Dr. Jenkins is survived by his wife Kitty Noordermeer Jenkins and two children, Ben and Anna-Lea; his mother, Helen Jenkins of Atlanta, and sister, Barbara Jenkins Riddle of Nashville. The family has suggested memorial donations be made to the Samford Undergraduate Research Program for research in Biology, c/o The Department of Biological and Environmental Sciences, PO Box 292234, Samford University, Birmingham, AL 35229-2234.

MINUTES OF ALABAMA ACADEMY OF SCIENCE SPRING EXECUTIVE COMMITTEE MEETING SAMFORD UNIVERSITY WEDNESDAY, MARCH 19, 2008, 7:00 PM; ROOM 033, SCIENCE CENTER

Call To order: 6:40 pm

Attending meeting; Safaa Al-Hamdani, Jim Bradley, Ellen Buckner, George Cline, Anne M. Cusic, Mijitaba Hamissou, Virginia Hughes, Richard Hutiburg, George Keller, Larry Krannich, Akshaya Kumar, Adriane Ludwick, Ken Marion, Mike Moeller, David Nelson, Mickie Powell, James Rayburn, P.C. Sharma, and Brian Thompson.

A. Call to order and discussion of minutes of the Fall 2007 Executive Committee Meeting

Motion to approve minutes: Minutes approved
Editor request Larry Krannich to edit minutes - so information not needed are removed
Hudiburg how to provide minutes as an archival purpose.

Motions voted on at meeting:

Motion/action item	Action/ taken	Person Responsible	Due date
Look into science fair look into independent account for set up see science fair report	Passed		Fall 08
Solicit a one page biography for a scientist from each college/university in Alabama for inclusion in the journal.	Passed		
Recommend including advertisement in the journal. If approved, determine the mechanism for soliciting advertisements	Passed		May 08
Determine the most equitable mechanism for advancing funds to support travel to ISEF without depleting academy resources or adversely affecting the finances of the coordinator	Passed	Virginia Valardi, David Nelson, Vanessa Colebaugh, Barry Mask	Fall 08
Make a decision concerning a possible 2009 symposium on animal use and care in research.	Passed	Mickie Powell Brian Burnes	Fall 08
Establish a committee to evaluate section effectiveness and the possibility of revising the various section designations		Adrian Ludwick	Fall 08

Establish a committee to explore how to rejuvenate AJAS and the regional competitions	Deferred to C18		
Obtain pictures of the Executive Committee and Annual meeting and submit these to the archives.	Agreed		End of meeting
Obtain nominations for the Gardner Award for next year.	Agreed		
Develop an on-line submittal form for Gardner Award nominations	Agreed	Brian	
Approve these two resolutions and read both resolutions at the Joint AJAS/AAS Banquet on Thursday even, March 20, 2008	Passed as ammended		
Proposed initiative to re-establish the net work for science competition.	No action recorded		
Go ahead and use on-line payment of membership dues using paypal.	approved		
Consititution and By-Law change to W.H. Mason scholarship committee	Approved	Full business meeting	

The following report, written reports were reviewed (C1 was done first due to a time conflict).

Agenda B, Officers Reports:

1. **Board of Trustees, Ken Marion - No written report**
2. **President, George Cline**

   I have been working to find people to fill committees. Several of these positions remain unfilled. We need to continue to work to fill all of our Appointed Committee positions. I'm still accepting nominations for open positions.

   I worked with Larry Krannich to finish and approve the Agenda and final preparations for the Thursday Night Banquet.

   Reviewed Ellen Buckner's proposal for stimulating new interest in the Gorgas Competition. This is a very good proposal, but I'm worried about funding.

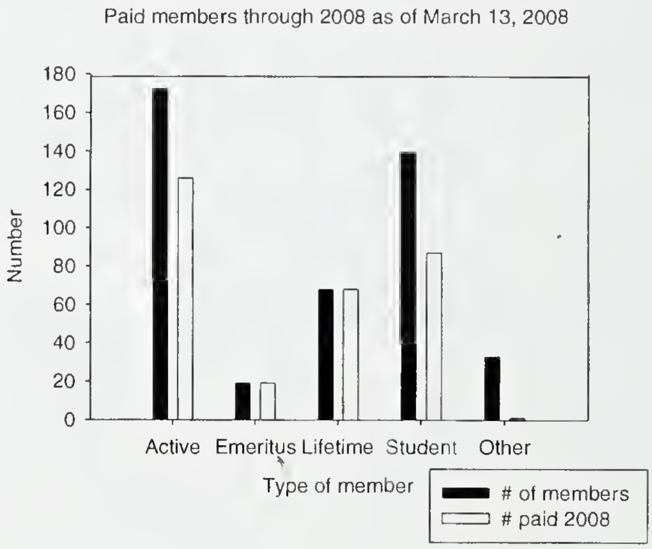
   I have been involved with the Treasurer and the Secretary in discussions regarding the Academy Budget. We are meeting our budget, but it is very tight. We all need to actively recruit new members. We're still having problems with the journal printing allocation from Auburn.
3. **President –Elect, Kenneth Roblee**

   My activities have been in recruiting speakers for and organizing the talks for the "Information Security Issues" Symposium. We have an impressive list of speakers in this area, including Gary Warner of UAB who works in computer forensics. Here is what we have:

8:00 – 8:40 AM Computer Security Ethics: Key Concepts and Themes Change, Yet Stay the Same. *Connie Price*, Tuskegee University.
8:50 – 9:30 AM Concepts of Information Security. *Jun Zhang*, Troy University.
9:40 – 10:30 AM *Gary Warner*, University of Alabama at Birmingham.
INTERMISSION
10:45 – 11:35 AM Computer and Network Forensics. *Yang Xiao*, The University of Alabama.
11:45 – 12:05 PM Infusing Ethics in the Information Technology Age. *Cynthia Lester*, Tuskegee University.

4. **Second Vice President, Brian Thompson**
   I will be searching for my replacement. Suggestions welcome
5. **Secretary, Jim Rayburn**
   1. In early December I sent out second reminder to current members who are not paid for 2008.
   2. In the last week of January I updated list for AAS and mailed a 3rd reminder to members who were not paid for 2008 yet. I did not send to libraries during this 3rd reminder.
   3. I have prepared minutes from October meeting and forwarded to the editor.
   4. As of March 13, 2008 we have 431 members (of which 267 are paid for 2008) members including library and other members. As of March 13, 2008 we have taken in approximately $5,100.00 in dues. This is almost $900.00 less than dues taken in for 2007. I have also received about $200.00 in dues for 2009.
   5. 172 Active members (126 paid; 46 not paid), 19 emeritus (19 paid), 68 lifetime, 139 Student (52 paid; 87 not paid), 33 other members (1 paid; 32 not paid)
   6. Membership by section

Section #	Total #	Not paid
1	135	37
2	32	6
3	4	0
4	6	1
5	89	56
6	4	1
7	6	2
8	18	3
9	45	12
10	15	7
11	10	3
12	3	1
77(other)	32	31
None selected	32	3



6. **Treasurer, Taba Hamissou**

Fall 2007 Executive Meeting	
cd(1) + cd(2) +cd(3)	$27,371.63
Saving account	$1260.70
Money Market	$275.18
Checking account	$5,096.52
Total Assets all accounts (October 31, 2007)	$34,004.03
March 14, 2008	
cd(1) + cd(2) +cd(3)	$28,994.40
Saving account	$1,261.01
Money Market	$245.35
Checking Account Bal. (03/14/08)	$4,126.50
2007 Meeting overage (not yet received)	$2,100.00
Total Academy Assets all accounts (March 14, 2008)	$34,627.26
February 2007 – October 2007	
Previous Balance (Reported 11-15-2007)	**$5,096.52**
Expenses 11/15/07 – 11/3/07	
November 2007	
Total Income	$3,544.49
Institutional Supports	$1,424.49
Manuscript fees	$300.00
Membership	$1,810.00
Mason	$10.00
Total Expenses	$949.76
Journal shipping	$811.52
Web	$138.24
Balance	$7,691.25
December 2007	
Total Income	$337.50
Institutional Supports	$337.50
Total Expenses	$500.00
Honorarium	$500.00
Balance	$7,528.75
January 2008	
Total Income	$1,380.00
Memberships	$1,380.00
Expenses	$3,942.17
Printing Service	$94.56
Honorarium	$500.00
Journal Printing cost	$3,347.61
Balance	$4,966.58

February 2008	
Total Income	$1,335.00
Memberships	$1,085.00
Institutional Supports	$250.00
Total Expenses	$2,250.00
2007 Res. Grants	$1,750.00
Honorarium	$500.00
Balance	$4,051.58
March 14, 2008	
Total Income (Memberships only)	$370.00
Total Expenses (Honorarium only)	$500.00
Balance	$3,921.58

During report we discussed some finance problems, and Recommendation for number of journal issues. Consensus of group - bring to fall meeting information about political science section

7. **Journal Editor, Safaa Al-Hamdani**

The following has been accomplished since the last meeting:

- The Alabama Academy of Science Journal Vol. 78 #3-4 has been successfully released. This issue had a great number of articles with a significant contribution to science at large.
- We are two months behind in releasing the first issue of the journal for 2008. I am planning to send all the articles to the publisher by the end of March.
- I would like to bring to the attention to the members of the academy to become more active in submitting papers to the journal and volunteering to submit manuscripts.
- I would like to invite each university in Alabama to submit one page biography for a selected scientist of their choice to be included in each issue of the journal.
- I encourage examining the idea of including advertisements in the journal to increase the revenue.

Action Items

1. Solicit a one page biography for a scientist from each college/university in Alabama for inclusion in the journal.
2. Recommend including advertisement in the journal. If approved, determine the mechanism for soliciting advertisements.

Asked Jim Bradley back as associate editor --

8. **Counselor to AJAS, B. J. Bateman No Report**
9. **Science Fair Coordinator, Virginia Valardi**

2008 International Science And Engineering Fair – Atlanta, Georgia

The seventeen Alabama INTEL/ISEF 2008 competitors will be leaving from, Mobile, Montgomery & Huntsville on the May 11th to attend the 2008 International Science and Engineering Fair in Atlanta, GA. All competitors will return home on May 16th. While in Atlanta, they will be staying at the Hyatt Regency. The cost per finalist will be as follows:

Travel $200
Hotel: $425
Miscellaneous expenses: Estimated at $50.00 (State winner T-shirt, snacks for day of judging etc.)
Total: $675

Meals etc.: $200.00 (recommended) This should be given directly to the finalist- but not too early so that they have the money with them.

Academy Costs:

Transportation:

Mobile	$1339.00
Montgomery:	$908.00
Huntsville:	$1500.00
Total	$3747.00

Hotel: 7 Rooms at 201.25/night x 5 nights = $7043.75

Miscellaneous expenses: unknown at the present time

Total Transportation & Hotel = $10,790.75

At the present time all of this cost ($10,000-$20,000) comes out of **my** pocket and is reimbursed after the regional fairs pay the Academy (this sometimes takes several months). This is a great inconvenience to me and my family. Can some other method of funding this endeavor be looked into? For example, is it practical to have an Academy Credit Card.

Action Item:

Determine the most equitable mechanism for advancing funds to support travel to ISEF without depleting Academy resources or adversely affecting the finances of the Coordinator.

10. Science Olympiad Coordinator, Jane Nall

Still the best kept secret in the State, many volunteers of Alabama Science Olympiad continue to provide students the opportunity to participate and compete in Science Olympiad. Teachers, parents, coaches, bus drivers, university professors, university work study students, and other volunteers work to provide the students of Alabama the joys of "doing science" in an arena resembling athletic tournaments.

Herculean efforts are made each year by staff and volunteers on several university campuses, and teachers, parents, and students of over 200 public and private schools, so they might experience the joys and thrills of doing lab hands-on science.

Presently, competition is in progress and state tournaments for middle and high schools will soon follow. Director is still working on incorporating Alabama Science Olympiad and seeking additional volunteers to serve on the Board of Directors.

Placing 10th in the nation for membership, Alabama Science Olympiad continues to grow in numbers of teams and participation at all levels. For several years now, because of the number of teams registering in Alabama, two teams in both Division B (grades 6-9) and Division C (grades 9-12) have advanced to the national competition following successfully winning at regional and the state tournaments. Only the top ten states in membership receive the second invitation at the secondary level to compete at the national tournament. The elementary levels compete at various local and regional tournaments.

The University of West Alabama, Jacksonville High School and Auburn University host an A2 tournament (grades 4-6) and report they have a great time, and they are already planning this year's tournaments. Five regional C tournaments (University of Alabama - Tuscaloosa and Huntsville, Auburn University, Jacksonville State University and the University of South Alabama) and four regional B tournaments (University of Alabama - Tuscaloosa and Huntsville, Auburn University, University of South Alabama are in full swing the month of February. We really need at least one more B host! State Alabama B will be held at Huntingdon College and Alabama C will be on the campus of Samford University in April.

Science Olympiad events address the National Standards for Science Education and comprise all areas of science including astronomy, meteorology, experimental design, genetics, anatomy, process skills for life science and biology, chemistry and polymers, physics, earth science and fossils, and water quality and the environment, map skills, GIS and remote sensing as well as building events such as a Rube Goldberg-like device, robot, bottle rocket, plane, bridge and tower building, musical instruments. Alternating events in taxonomy include topics of trees, amphibians and reptiles, birds, insects.

Director Nall is in search of more universities willing to host tournaments! Consider showcasing your campus and join us in the fun! The State Director is appointed by the Alabama Academy of Science. To date Alabama has been lead by two directors – 1985-1996 Mr. Steven Carey, University of Mobile and 1997-present Ms. Jane Nall, Spanish Fort High School and the University of Mobile.
National this year will be in our Nation's Capitol at George Washington University, May 30-31.

11. **Counselor to AAAS, Steve Watts**
The annual meeting for the AAAS affiliates convened on February 14-18, 2008 in Boston, Mass. The general theme of this year's meeting is **Science and Technology from a Global Perspective.** This theme emphasized the power of science and technology as well as education to assist less-developed segments of the world society, to improve partnerships among already-developed countries, and to spur knowledge-driven transformations across a host of fields. All state Academies maintain an association with the American Association for the Advancement of Science. We are members of the Section on Agriculture, Food and Renewable Resources and the Section on General Interest in Science and Engineering.

We welcome the opportunity for any AAS member to attend the AAAS meeting on our behalf. Information about the AAAS can be obtained at www.aaasmeeting.org.

12. **Section Officers**
I. Biological Sciences, Mickie Powell
The final numbers for Section I presentations at the 2008 meeting at Samford are:
A total of 72 presentations at the 2008 meeting.
41 papers
31 posters

24 students are entered in the competition for best paper
13 students are entered in the competition for the best poster

Dr. Gene Hines (UAB, IACUC) has expressed an interest in organizing a symposium on animal use and care in research for the 2009 meeting. This would give students an introduction to the importance of proper protocols and treatment of animals in research.

I contacted Dr. Megan Gibbons at Birmingham Southern University to ask if she would be interested in serving as vice-chair for the Biological Sciences section.

Action Item

Make a decision concerning a possible 2009 symposium on animal use and care in research.

II. Chemistry, Houston Byrd – No report

III. Geology & Earth Science, Mark Puckett – No report

IV. Geography, Forestry, Conservation & Planning, Greg Gaston No report

V. Physics & Mathematics, Brian Thompson

We are very happy to report that a total of thirty presenters are presenting their research work in the Physics and Mathematics Section, this year at the 85th annual meeting of the Academy. Twenty two oral presentations and eight poster presentations have been submitted.

An invited talk on "Optical characterization and device fabrication of wide band gap semiconductors" will be presented.

Four student papers for oral presentations and one poster presentation has been entered in the student award competition.

VI. Industry & Economics, Marsha Griffin – No Report

VII. Science Education, Karen Utz – No report

VIII. Behavior & Social Sciences, Richard Hudiburg

I discussed with the section chair of Section IV, Greg Gaston, combining sections IV and VIII into a joint meeting for the 85th annual meeting due to the small number of papers submitted. This arrangement was approved by the Executive Director of AAS.

The joint session of Section IV – Geography, Forestry, Conservation, and Planning and Section VIII – Behavioral and Social Sciences had 7 papers submitted and 5 posters for the 85th annual meeting of the Alabama Academy of Science.

IX. Health Sciences, Melinda Lawson –No report

X. Engineering & Computer Science, Brian Toone

I have prepared the program for the upcoming annual meeting. There were 6 paper and 2 poster presentations submitted for the 85th annual meeting of the Alabama Academy of Science. Out of those, 2 paper and 2 poster submissions were also entered into the student paper/poster competition. Lastly, two students applied for travel awards.

XI. Anthropology, Harry Holstein – No report

XII. Bioethics & History/Philosophy of Science, Michelle Sidler

Section XII will have five presentations at the AAS 08 meeting. This number is a small increase from last year's Section meeting, but it is still low participation. I attempted to raise participation by contacting researchers in biology, philosophy, and related fields and by providing a keynote speaker, Lynn Holt, who is a Genetic Counselor at UAB. Unfortunately, the impact of these efforts was minimal. At the AAS 08 meeting of Section XII, I plan to discuss ways to improve participation, such as developing attractive yearly themes and creating a network of contacts.

13. **Executive Officer, Larry Krannich**

Since the last Executive Committee Meeting, the Executive Director's activities have focused on the following:

1. The e-mail distribution list of all department chairs and selected faculty and a list of departmental URL's at Alabama colleges and universities for those departments appropriate for the 12 Sections of the Academy were updated and distributed to all Section Chairs to aid them in developing e-mail contact lists for the Academy sections, solicit new members, and develop meeting programming.
2. 3,500 bookmarks were mailed in packets to appropriate departments at all Alabama colleges and universities advertising the 85th annual meeting and soliciting title submissions.
3. I worked with Brian Toone to have on-line submission of paper/poster titles and abstracts and executive committee reports for the annual meeting. The submission site included check-off boxes for students to enter the paper/poster competitions and request travel awards without having to proceed to another site.
4. January and February were spent coordinating with section chairs, symposium chair, the local arrangements chair, state counselor to the junior academy, and Gorgas Competition chair in the development of the program and program booklet for the 85th annual meeting of the Academy. The program booklet for the 85th annual meeting was constructed and posted on the web (February 15, 2008). Corrections and program changes were made over a three week period, with the final version posted on March 10th and printed on March 13th.
5. E-mails were sent to all paper/poster presenters thanking them for their participation and notifying them of poster guidelines and the posting of the program on the web site.
6. Agreements were obtained from all five of the local sections of the American Chemical Society in Alabama to cosponsor the Alabama Statewide Chemistry Undergraduate Research Symposium.
7. Certificates for the Carmichael Award, all Section paper/poster competition winners, participants in the Alabama Statewide Chemistry Undergraduate Research Symposium, and symposium competition winners were designed and printed.
8. The officers and committee chair report compilation was prepared and distributed electronically prior to the Spring Executive Committee meeting and hard copies were available at the meeting.

Recommendation to look into increasing awards for more presentation and poster awards for biology because it is so large to the Research committee.

Agenda C. Committee Reports

1. Local Arrangements, George Keller

98 PRE-registrations TAKEN IN 4000
TOTAL COST $3,700

Registration will take place starting at 4:00 on Wednesday in the second floor hallway of the Sciencenter at Samford University. The Sciencenter will host the Alabama Academy of Science and the Junior Academy talks and poster sessions, and the Gorgas competition will take place in the neighboring Russell Hall. Breakfast, as described below, will be provided on Thursday and Friday mornings in the second floor hallway of the Sciencenter. Box lunches from Jason's Deli will also be provided on both Thursday and Friday, and refreshments will be delivered on Thursday afternoon. The banquet will be held in the Samford cafeteria on Thursday evening at 7:00. Dr. Larry Davenport will give the welcome to Samford, and Dr. Mike Howell will deliver the address. The Friday morning symposium will take place in the Brock Forum in Dwight Beeson Hall, and the Gorgas/Alabama Junior Academy of Science awards reception will be held in Sciencenter 109.

My understanding is that all judges for the competitions have been recruited.

Budget for AAS Spring Meeting

Wednesday, March 19
  Executive Council Dinner
    @ $20.00 per person (number to be determined)
Thursday, March 20
  Continental Breakfast in second floor atrium
    Coffee for 50
    Bottled juice on ice for 100
    10 dozen pastries $510.00

  Snacks in second floor atrium
    Assorted soft drinks chilled on ice
    Gourmet cookie platter for 100 $340.00

  Banquet (buffet)
    Salad, grilled chicken breast, penne/broccoli alfredo, green beans, rice pilaf, tea, water, rolls, pie
    200 @ $15.50 + $400 labor $3500.00
Friday, March 21
  Continental Breakfast in second floor atrium
    Coffee for 50
    Bottled juice on ice for 100
    10 dozen pastries $510.00

Other expenses	
Table delivery	
Name tag materials	$40.00 (approx)
Outdoor signs	$26.50
Printing	

2. Finance, Ken Marion

The assets of the Academy as reported at the Fall Executive Committee meetings and Annual Spring meetings since 2001 are listed below.

Period	Assets (End of Period)	Change	Period	Assets (En of Period)	Change
1/1-10/12/2001	$71,763		1/1-12/31/2001	$75,813	
1/1-10/12/2002	$72,197	$434	1/1-12/31/2002	$72,813	-$3,000
1/1-10/26/2003	$71,403	-$794	1/1-12/31/2003	$74,800	$1,987
1/1-10/26/2004	$74,265	$2,862	1/1-12/31/2004	$74,610*	$-$190
1/1-10/26/2005	$63,895	-$10,370	1/1-12/31/2005	$65,561*	-$9,049
1/1-10/12/2006	$62,162	-$1,733	1/1-12/31/2006	$67,555*	-$1,994
1/1-10/26/2007	$34004	-$28,158	1/1-12/31/2007	$36,435*	-$31,120

*estimated

The financial assets of the Academy declined dramatically during 2007. Because of expenses owed during the period, we were forced to cash in a CD. The treasurer's report indicates large expenses associated with (1) The Journal of the AAS and (2) The Science Fair. The Academy will seriously need to examine ways to reduce the expenses in these two areas and may need to consider new revenue sources (i.e., increase in dues, registration fees, or page charges)

3. Membership, Mark Meade – No report

4. Research, Steve Watts

This year 26 students (up from 12 and 19 from 2007 and 2006, respectively) applied for travel awards to the 85th Annual Meeting of the Academy being held on the Samford campus. All were presenting papers or posters. All students were from out of town and were each awarded up to $35, depending on distance. Budgeted amount for travel is $750. In addition, only 4 students applied for research grants. The committee evaluated the grants and all of these were awarded in full ($1,000 of the budgeted amount of $2,400). Approximately 45 students (up from 12 last year and 23 the previous year) have applied for the Research Paper/Poster Competition in several sections. New (slightly modified) evaluation forms and suggested criteria were sent to all section chairs and are now on the web.

All categories of awards and activities were handled electronically for the fifth year. Several minor modifications may be needed for next year, but in general electronic submissions greatly improved the process.

As discussed last year, the paper/poster competition will be held on Thursday only, with the banquet on Thursday night where winners will be announced. This was difficult for some sections because of the large number of individual participating in the competition that did not allow for scheduling options. We will survive and flourish with these continued problems!

5. **Long-Range Planning, Adrian Ludwick**

The committee met by e-mail in order to formulate this report. Three of the four members listed were able to communicate in this manner. From this, two ideas surfaced for presentation to the Executive Committee for further consideration.

- Establish a committee to evaluate the activities of the various sections of the AAS toward the goal of finding mechanisms to better support the sections. This committee will also be charged to present to the AAS possible new combinations of sections, elimination of sections, and the addition of new sections.

- Establish a committee to explore a mechanism to rejuvenate the AJAS, particularly the individual competitions that occur in the various regions.

Members of the Committee:
Anne Cusic
Ken Marion
Eugene Omasta

Establish a committee to evaluate section effectiveness and the possibility of revising the various section designations.
Establish a committee to explore how to rejuvenate AJAS and the regional competitions.

6. **Auditing, Senior Academy, Sergey Belyi - No report**

7. **Auditing, Junior Academy, Henry Barwood – No report**

8. **Editorial Board & Associate Journal Editors, Thane Wibbels – No report**

9. **Place and Date of Meeting, Mark Meade – No report**

10. **Public Relations, Roland Dute – No report**

11. **Archives, Troy Best**

We need to obtain photographs (especially of members of the Executive Committee), committee reports, minutes of the AAS Executive Committee meetings, and any other materials that may be of interest to our membership. Items that may not seem of interest at present may be of great interest in the future. Photographs of officers and members at meetings are of special interest.

If you have items that you believe may be worthy of inclusion in the AAS Archives, please send them to me or to Dr. Dwayne D. Cox, University Archivist, Auburn University Ralph B. Draughon Library, 231 Mell Street, Auburn University, AL 36849.

Access to our AAS Archives is available 7:45-4:45 Monday-Friday. Dr. Cox has provided the following information relative to access. Archives materials **do not** go out on Interlibrary loan. Patrons can come in and use them according to the donor specifications. Some require special permission from the donating office or persons who made the donation or sometimes the archivist. Materials to be used at night or weekends need to have special arrangements made so they can be pulled before 4:30 in the afternoon (Friday afternoon for weekend use). Copies can be made in most cases and that can be done either by going through InfoQuest or contacting Dr. Cox or the reference desk at 334/844-1732.

I encourage all officers and members of the AAS to donate significant documents, photographs, etc. to the archives.
Action item
Obtain pictures of the Executive Committee and Annual meeting and submit these to the archives.

12. Science and Public Policy, Scott Brande

Although no committee meetings were held this past year, I followed a few relevant issues.

Evolution in the public school classroom

Similar to previous legislative actions in other states, the Senate Education Committee of the Alabama legislature met in March, 2006 to consider SB45, a bill to ostensibly protect the academic freedom of teachers and students who wish to express in the science classroom opinions antithetical to evolution. The origins of the text are unknown, but relate to language used by PA Senator Rick Santorum who wanted to modify the No Child Left Behind Act with similar language. I and a number of other speakers appeared before the committee to express views both pro and con. The bill was not enacted.

However, similar “Academic Freedom Act” bills have been proposed in other states, most recently Florida (March, 2008).

It is likely Alabama will again see similar bills (as it has since 2000). I'll stay informed on this issue.

Evolution in the news

February 12, 2008 was the 199th anniversary of Charles Darwin's birth, and is annually celebrated around the world as "Darwin Day". An interesting component is the celebration of Darwin Day by various religious congregations and clergy, organized by Michael Zimmerman, Dean of the College of Liberal Arts and Sciences at Butler University. His site provides background and many links.
http://www.butler.edu/clergyproject/rel_evolution_weekend_2008.htm

I sent background material to area clergy, the Birmingham News, and WBHM.

Needless to say, Darwin Day 2009, the bicentennial, promises to be more visible around the world.

13. **Gardner Award, Prakash Sharma**
There had been no nominations for Gardner Award this year.

There had been several nominations for the "Fellow of Alabama Academy of Science (F. A. A. S.)". A few fellows have been nominated, selected and elevated to the status of "Fellow of Alabama Academy of Science (F. A. A. S.)". All winners are of the highest quality in terms of their contributions to science. The names of the winners will be officially announced during the Banquet of the "85th Annual Joint Meeting of Senior & Junior Academy of Science" on Thursday, March 20, 2008.
Actions items
Obtain nominations for the Gardner Award for next year.
Develop an on-line submittal form for Gardner Award nominations

14. **Carmichael Award, Richard Hudiburg**
There are co-winners of the Emmett B. Carmichael Award for 2007.
Dr. Kristin A. Bakkegard, Utah State University
"Interactions Between the Red Hills Salamander and its Potential Invertebrate Prey" *Journal of the Alabama Academy of Science*, 78(1), 1-12.

Dr. Gerard Elfstrom, Auburn University
"Science and the Understanding of Consciousness"
Journal of the Alabama Academy of Science, 78(1), 53-66.

There were ten articles reviewed by the committee. These articles were either in the January 2007 (5 articles) or July/October 2007 (5 articles) issues of volume 78 of *The Journal of the Alabama Academy of Science*.

The award will be split between the co-winners.

15. **Resolutions, Mark Meade**

The Resolutions Committee prepared two resolutions to be presented to the Executive Committee and read at the Banquet. These are as follows:

Resolution of thanks to Samford University

To honor and recognize Samford University and the Local Arrangements committee for their outstanding efforts in hosting the 2008 Annual meeting.

Whereas, Samford Professor Dr. George Keller did chair and act as University Liaison Officer and made all arrangements for the 2008 meeting.

Whereas, Samford Professor of Geography, Dr. Eric Fournier did act as AAS Program Coordinator.

Whereas, Samford Professor of Sociology, Dr. Hugh Floyd, did act as AJAS Program Coordinator.

Whereas, Samford Professor of Biology, Dr. Betsy Dobbins, did act as Gorgas Program Coordinator.

Whereas, Samford Professor of Chemistry, Dr. Brian Gregory, did act as Registration Coordinator.

Whereas, Samford Professor of Physics, Dr. Tommy Tarvin, did act as AV Equipment/ Services Coordinator.

Whereas, Samford Professor of Psychology, Dr. Sandy Willis, did act as Parking/ Traffic Coordinator.

Whereas, Samford Biology faculty, Mr. David Frings and Dr. Ron Hunsinger, did act as Poster Coordinators.

Whereas, Samford Professor of Math and Computer Science, Dr. Steve Donaldson, did act as Publicity Coordinator.

Whereas, Samford Dining Services personnel, Ms. Jane Germeck, did act as Banquet/ Dinner Coordinator.

Now, therefore,

Be it resolved by the Alabama Academy of Sciences Resolution Committee, its executive committee concurring:

That the membership of the Alabama Academy of Sciences, by this resolution,
honor and recognize Samford University and the AAS local arrangements committee for their outstanding efforts in organizing and conducting the 2008 Annual meeting of the Alabama Academy of Sciences.

Be it further resolved that a copy of this resolution be forwarded to Samford University.

Resolution in honor of Ron Jenkins

To honor and recognize Samford University Professor RONALD L. JENKINS for his outstanding efforts and contributions to science, education, and the academy.

Whereas, Dr. Jenkins earned a bachelor's degree in biology from Carson-Newman College in Tennessee, and an M.S. in zoology and Ph.D. in physiology from Auburn University.

Whereas, Dr. Jenkins taught biology at Samford University for 19 years.

Whereas, Dr. Jenkins co-taught a successful field zoology courses that resulted in new teaching methodologies using photography of live specimens with online field guides to supplant previous methods of killing and preserving specimens.

Whereas, Dr. Jenkins was known as a believer in the reverence of life and that nature was given to man to protect.

Whereas, Dr. Jenkins was a dedicated scientist and teacher who was generous with his time and energy in encouraging students to pursue research, to appreciate nature, and to explore options in careers in biology.

Whereas, Dr. Jenkins teaching expertise was diverse and included many subjects such as physiology, zoology, anatomy, cell and molecular biology, and environmental ethics and values.

Whereas, Dr. Jenkins received international recognition for his work identifying steroids and hormones as environmental pollutants.

Whereas, Dr. Jenkins assisted in the development of the new Interpretive Center at Oak Mountain State Park to help protect wild areas, clean stream sites, and preserve native species.

Whereas, Dr. Jenkins helped create a butterfly preserve along Shades Creek near Samford University.

Whereas, Dr. Jenkins served the Alabama Academy of Sciences for numerous years in leadership roles and as its president in 2004-05.

Now, therefore,

Be it resolved by the Alabama Academy of Sciences Resolution Committee, its executive committee concurring:

That the membership of the Alabama Academy of Sciences, by this resolution, honor and recognize Samford University Professor Ronald L. Jenkins for his outstanding efforts in the biological sciences, science education, and environmental awareness and protection and an issue of the Journal be dedicated to Ronald L. Jenkins.

Be it further resolved that a copy of this resolution and the Journal issue be forwarded to the Jenkins family.

Action Items:

Approve these two resolutions and read both resolutions at the Joint AJAS/AAS Banquet on Thursday even, March 20, 2008.

16. Nominating Committee, Brian Thompson

The nominating committee will be searching for Trustees to replace Ken Marion, Prakash Sharma, James Bradley, and David Nelson, whose terms on the Board expire this year. Suggestions welcome David Nelson has agreed, Jim Brady, Sharma,Marion agreed to stay on.

17. Mason Scholarship, Mike Moeller

We had three complete applications for the William H. Mason Fellowship this year. After considering the application material, the committee selected Ms. Sheri Grosso for the $1,000 fellowship. Ms. Grosso was notified of the award, has accepted the Fellowship and she and her husband will be attending the banquet at the 85th annual meeting of the Academy. Ms. Grosso received a B.S. with a major in Biology from the University of North Alabama in 1993. She is returning to the University of North Alabama for an M.A. in Education with certification in Biology.

I greatly appreciate the service of reviewing the applications performed by Committee members Charles Eick, Malcolm Braid, and Jane Roy.

18. Gorgas Scholarship Program, Ellen Buckner

In 2008 we receive an increased number of applications with increased quality. The twelve finalists represent the breadth of the state—northern, central and southern. The ASTA state meeting was not held this year which may have limited publicity but the announcement went out to all high schools and several list-servs.

The Committee would like to recognize the outstanding teacher-sponsors of these students. Their work in encouraging students to enter the competition is instrumental to both the success of the program and to the success of the students. These are as follows:

Brooks High School	Vicki Farina
Jefferson County International Baccalaureate	Catherine Shields, Debbie Anderson
Patrician Academy, Butler	Brett Evans
Randolph School	Peggy Walker
Shades Mountain Independent Church Academy	Janice Laatsch
Wetumpka High School	Virginia Vilardi

The Legacy Endowment Program (LEP) at the Alabama Power Foundation (APF) continues to perform well. The income available from the LEP 2007 distribution was $17,820. In August, 2007, the Foundation sent scholarship checks totaling $11,500 and a check to the Alabama Academy of Science for $3,282 for expenses of competition. The remaining balance was $3,038, of which $3,000 was requested for additional expenses for program development in December, 2007. The distribution amount available for 2008 is $18,001.

In 2006 the Gorgas Competition began its own account with receipts from the APF fund. Additional income from the account was deposited and resulted in a stable resource of approximately $3000 per year. A proposal to use those funds for building school involvement is attached.

In 2007 the committee initiated an "Outstanding Gorgas Teacher-Mentor" award which was given to Ms. Vicki Farina, Brooks High School, Killen. This award includes a $500 honorarium. Thanks to all for efforts of the committee and judges on behalf of the Gorgas Scholarship Competition. In 2008 we began inviting Gorgas finalists to post abstracts for the JAAS. Thanks to George Cline, Brian Toone and Larry Krannich for their assistance.

The finals of the Gorgas Competition will be held Friday, March 21st in Room 125 of the Russell-Ingalls Building at Samford University, Birmingham. The Committee would like to thank Dr. George Keller for his excellent assistance in preparations for the Gorgas competition and recruitment of judges from Samford University. Please attend the open viewing of Gorgas exhibits from 12:00 to 2:00 in Room 125 of the Russell-Ingalls Building. The winners will be announced at the Awards reception at 4:00.

Finalists in the 2008 Alabama Science Scholar Search and Gorgas Scholarship Program are listed below in alphabetical order. The final competition will be held during the annual meeting of the Alabama Academy of Science, March 20-21, at Samford University, Birmingham, Alabama.

Ryan Edward Dawson	Jefferson County International Baccalaureate, B'ham
Ashley Elizabeth Getwan	Jefferson County International Baccalaureate, B'ham
Phillip Higginbotham	Jefferson County International Baccalaureate, B'ham
Charlotte Mae Crowther Kent	Jefferson County International Baccalaureate, B'ham
Molly Kathleen Kirkpatrick	Brooks High School, Killen
Kathryn LeCroy	Jefferson County International Baccalaureate, B'ham
Aeriel Murphy	Wetumpka High School, Wetumpka
Christopher Dean Romanczuk	Randolph School, Huntsville
Melissa Renee Snow	Patrician Academy, Butler
Kirstin Sockwell	Jefferson County International Baccalaureate, B'ham
Whitney Kiara Thomas	Ramsay High School, B'ham

19. Electronic Media, Brian Toone

I was asked to do a number of things at the Fall executive meeting. I have accomplished the following tasks:

Website:

I posted updates to the Constitution. I contacted BJ Bateman to determine what is desired for the Alabama Junior Academy of Science. The answer was a page on the website describing the junior academy and perhaps posting announcements about the junior academy. I am in the process of acquiring information to go on this page.

Annual Meeting Title and Abstract Submission:

I altered this year's submission procedure to make it easier for student's to enter the paper/poster competition as well as apply for a travel award. Students only had to check a box after reading the rules/regulations.

Also, I modified the abstract submission page to allow authors to add "special instructions" to be given to the journal editor regarding the typesetting of their abstract.

A problem was discovered late in the submission process whereby some entries with special characters in the title or abstract were being cut off. I mass emailed everyone who had submitted an abstract, and a few corrections were made to abstracts by the authors themselves in response to this email.

Spring Executive Report Submission Page

I modified the report submission page to send an email confirmation with the list of all files that were submitted. I also had an email sent to the report gatherer every time a submission was made. I created a page for the report gatherer to download individual reports. I fixed the error message to make it clear that a submission attempt failed (typically because of an incorrect password).

Online Membership Application

I have prepared a powerpoint presentation that indicates what it will take to allow people to apply for and renew their online membership online via Paypal. There is no monthly cost associated with this service, but each transaction is charged 2.9% + $0.30. For example, if we charge $30 for a one year membership, then $28.83 will be transferred to our Paypal account. I contacted Paypal support and was told that it is possible to have funds automatically transferred to a bank account.

Online Journal

Lastly, I was asked to post recent issues of the Journal and track the download statistics. I have done so and included the statistics in the powerpoint presentation. To summarize, we had a grand total of 1,335 hits on the journal issues. I would roughly estimate this as 133 unique visitors because many visitors would hit the issues multiple times (i.e., hitting back button reloads pdf and records new hit in the logfile).

Action Item

Make a decision concerning on-line payment of membership dues using PayPal.

D. Old Business

E. New Business

Get one member by next year to all exec committee

F. Adjournment (Time: 10:11 pm)

ALABAMA ACADEMY OF SCIENCE
SPRING 2008 BUSINESS MEETING
SAMFORD UNIVERSITY
MARCH 20, 2008

Call to order : 6:00 pm

Attendance: Safaa Al-Hamdani, B.J. Bateman, Brain Burnes, George Cline, Mijitaba Hamissou, Richard Hudiburg, Larry Krannich, Akshaya Kumar, Adriane Ludwick, Ken Marion, Mike Moeller, David Nelson, Mickie Powell, Erin Philliips, James Rayburn, Ken Roblee, P.C. Sharma, Catherine Shields, Brian Thompson, Stephen Watts,

Moment of silence for Ron Jenkins
Treasure report discussion on How to improve funds and Cash flow
Biology section may possibly have undergraduate and graduate students awards in the fall decide at fall business meeting -
Long range planning committee will work on Section effectiveness and designations - Requirements for naming awards

Motion to Vote to change Carmichael - approved
Resolutions
1. Samford motion and voted and approved
2. Ron Jekins motion and voted and approved

Slate for board of trustees Accept slate as offered -
Brian Burnes nominated for 2nd vice-president
Motion made and seconded - accepted
Motion on Mason scholarship accepted -
Announcement:
Check membership list:
New Treasurer may be needed soon.
Need more people participation in academy
Come and bring one new people to academy.

Alabama Academy of Science Journal

Scope of the Journal:

The Alabama Academy of Science publishes significant, innovative research of interest to a wide audience of scientists in all areas. Papers should have a broad appeal, and particularly welcome will be studies that break new ground or advance our scientific understanding.

Information for the Authors:

- Manuscript layout should follow the specific guidelines of the journal.
- The authors are encouraged to contact the editor (E-mail: sah@jsu.edu) prior to paper submission to obtain the guidelines for the author.
- At least one author must be a member of the *Alabama Academy of Science* (except for Special Papers).
- The author(s) should provide the names and addresses of at least two potential reviewers.
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